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THE MOTION PICTURE
PROJECTIONIST



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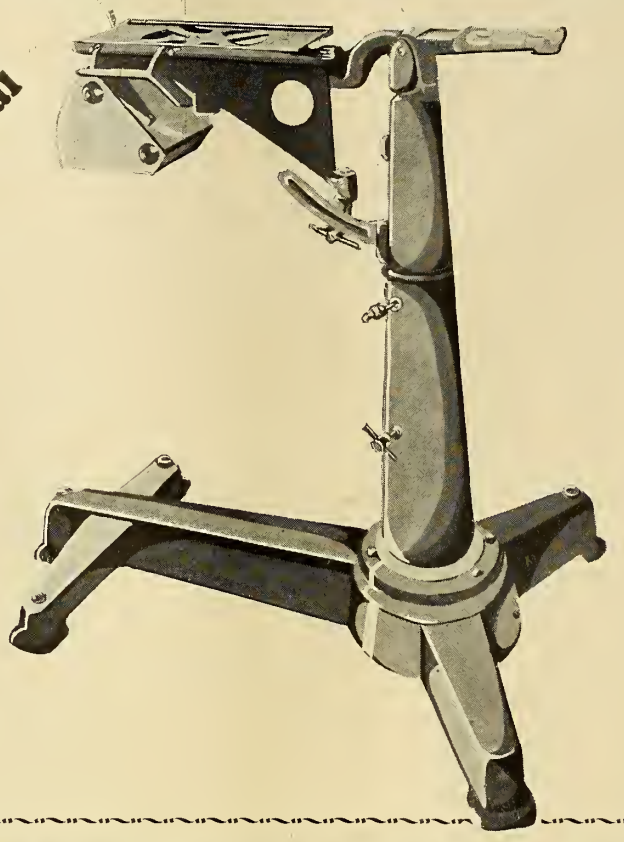
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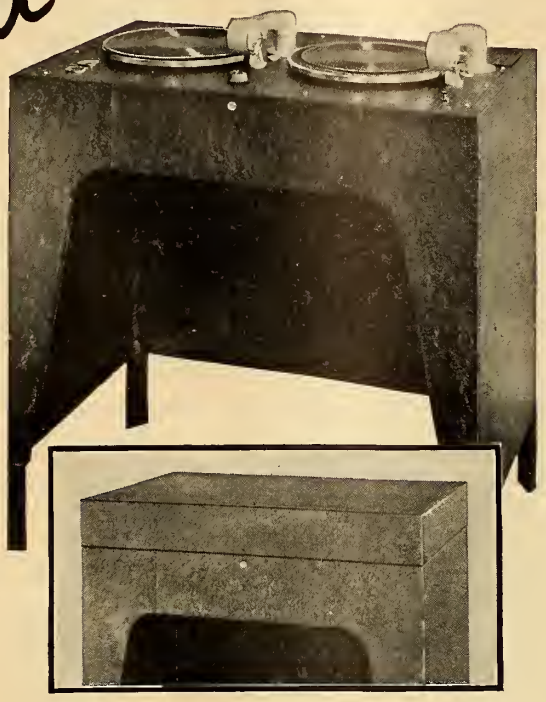
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THE MOTION PICTURE PROJECTIONIST

OCTOBER, 1928 The Motion Picture Projectionist, 45 West 45th Street, New York Vol. 2—No. 1

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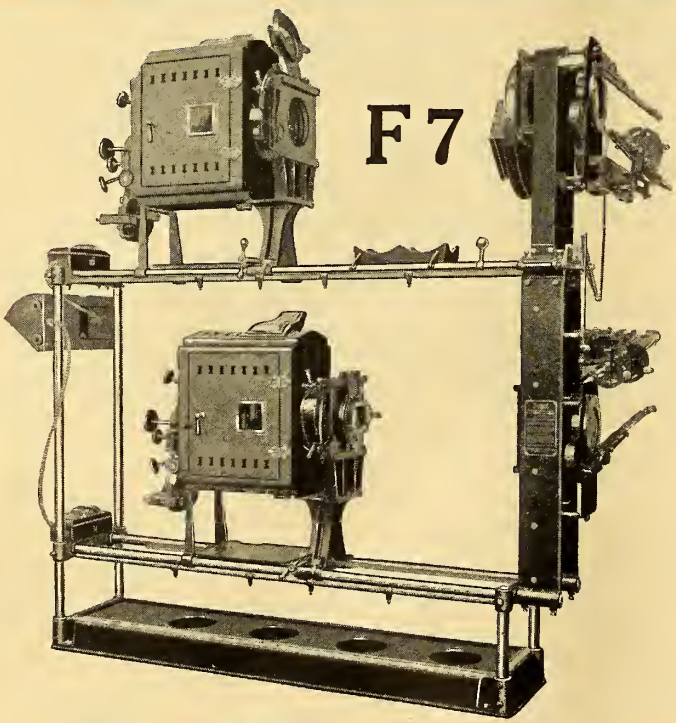
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S. M. P. E. Elects

The following were elected to office in the Society of Motion Picture Engineers at the recent Fall Meeting held at Lake Placid, N. Y.: President, L. C. Porter; Vice-President, Henry P. Gage; Treasurer, William Hubbard, and Secretary, Robert Durnat.

Herford Cowling and William Kunzmann were elected to the Board of Governors.

The Fall Meeting was one of the most successful in the Society's history, being in the nature of a symposium on sound pictures. Many interesting papers were read, extracts from which will appear in these columns from time to time.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of THE MOTION PICTURE PROJECTIONIST, published Monthly at New York, N. Y., for October 1, 1928.

STATE OF NEW YORK } ss.
COUNTY OF NEW YORK }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Boone Mancall, who, having been duly sworn according to law, deposes and says that he is the owner of THE MOTION PICTURE PROJECTIONIST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Craft Publishing Co., 45 West 45th St., New York City; Editor, Boone Mancall, 45 West 45th St., New York City; Managing Editor, James J. Finn, 45 West 45th St., New York City; Business Manager, James J. Finn, 45 West 45th St., New York City.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Boone Mancall, 45 West 45th St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is . . . (This information is required from daily publications only.)

BOONE MANCALL,
Owner

Sworn to and subscribed before me this 28th day of September, 1928.

NATHAN REIGROD.

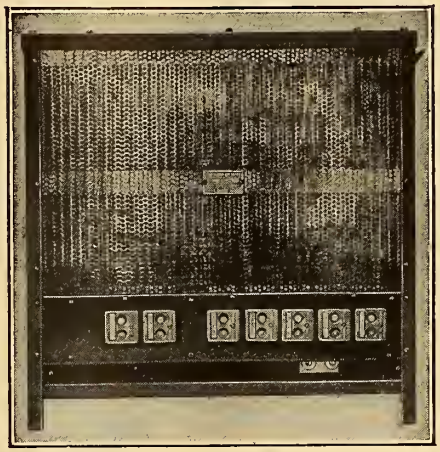
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Motor Elements for Exponential Horns

BY J. GEORGE UZMANN

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DURING the last year or two there has appeared in the technical and more popular radio press an ever increasing number of articles relating to the characteristics, design and construction of modern horn type loud speakers. Horns of earlier varieties employed in radiating the power output of an audio amplifier system followed no scientific formula as to their overall construction—that is to say, horn length, ratio of expansion, throat and mouth area, &c.

Today in contrast to old-style horns we note a thorough study of the subject has brought to light facts that horns, just like most other electro-mechanical equipment, follow definite laws, and if these are fully appreciated, sound radiators of so-called exponential types, together with suitable motor elements, can be built to give very faithful reproduction of note frequencies, covering the range from 40 to 5,000 cycles and possibly higher.

The modern conception of properly built horns of exponential design are based upon



Fig. 1—A typical exponential horn. This one is six feet in length. The horn is formed of specially prepared canvas webbing

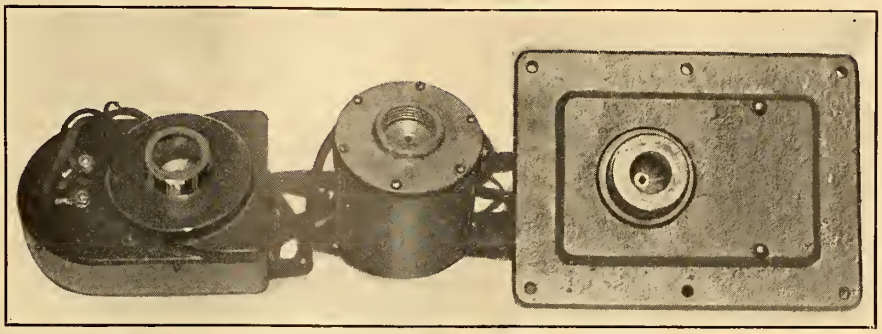


Fig. 2—Three types of units designed for use with horn speakers

the original work done by C. R. Hanna and J. Slepian of the Westinghouse E. & M. Company. Their paper, "The Function and Design of Horns," which appeared in the Journal of the A. I. E. E., March, 1924, is most complete, and may be reviewed by those interested in its theory.

While the purpose of the present paper relates essentially to motor elements for horn type speakers, nevertheless a few words and general remarks on horns proper should also prove helpful.

Horns Must Be Long

As a result of the publication of Hanna's and Slepian's classic work, it was shown that no type of horn would give faithful reproduction unless rather lengthy units, say, no less than five feet, together with a design where the rate of expansion or change in rate of taper would necessarily mean horns of relatively large bulk. This, of course, put a damper on the general adaptation of horns of all types. Further, cone-shaped speakers were being advocated at about the same time, and because this form of sound radiator is fairly small in size and possessed tonal qualities much better than the accustomed short horns of ordinary design, we see why in a large measure horns in general were abandoned.

However, Maxfield and Harrison of the Bell Telephone Laboratories in 1926 showed how in the present designs of orthophonic phonographs and other associated apparatus, together with exponential type horns, made possible phonographic reproduction so realistic that the older types could offer no comparison. In these new designs the horns were constructed or folded up so as to fit into a standard phonograph cabinet. This idea at once showed a practical method for adopting the original research on horn theory as proposed by Hanna and Slepian.

Many Applications

Since that time exponential horns have been built in all shapes and of equivalent lengths up to twenty-five feet or more. Large horns of these types have been developed for the Victor Talking Machine Company, the Signal Corps, the Bell Telephone Laboratories and in somewhat smaller size for the Vitaphone and Movietone talking motion picture installations.

Capt. Ely of the Signal Corps has likewise done considerable research work in the detection and direction of aircraft using several horns of this type having a length of approximately fifteen feet. These horns were mounted on a motor chassis for mobile operation.

In average broadcast receiver fields the Temple and Racon Companies and others, too, have done considerable work in turning out folded horns closely following exponential designs. Cabinet manufacturers, likewise, have built up similar types of wood, going as an integral part of the cabinet.

Horn Materials Are Varied

Several materials are available for building horns. The Victor Talking Machine Company ordinarily employs wood construction. In most other designs a plastic such as papier mache, plaster and the like is usually resorted to. In Figure 1 is shown a non-folded horn six feet in length made up of a doped canvas webbing. This type of horn possesses many desirable characteristics, particularly that of anti-resonance and a fairly low absorption factor. This horn is the result of experimental work carried out by the Dupont company. While the writer believes it is the best available (even considering its fairly high cut-off frequency), its principal drawback lies in the fact that the material of which it is constructed restricts manufacture in anything but a straight design.

Electro-Magnetic Drive Motors

Where wood or plastics are resorted to considerable care must be exercised in determining a design which shall be reasonably free from resonance or that resonance peaks fall at points different from those caused by the motor element proper. Since there already is available a number of articles on horn design the remaining portion of this paper will deal with suitable motor element for such types of sound radiator—a subject upon which little or nothing has been said up to date.

In Figures 2 and 3 are shown examples of what may be considered modern types of scientifically designed motor elements for use with horn speakers. The several units are of electromagnetic construction, using a reed or tie rod connecting between a balanced armature and diaphragm.

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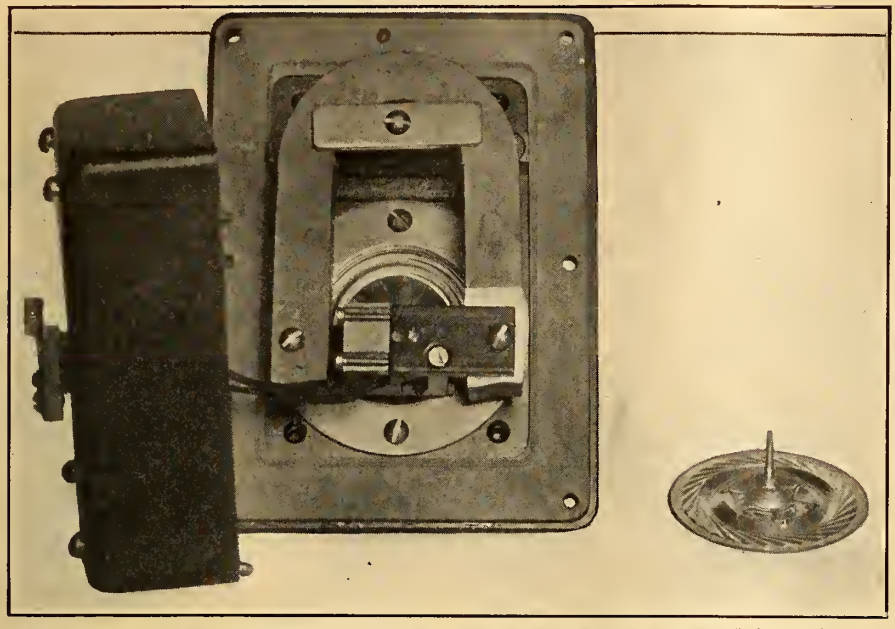


Fig. 3—The unit shown above is the same as the one at the extreme left in Fig. 2.

shown in Figure 2 is interesting in many ways because of its "historic" value. This unit was developed by Alexander Nyman of the Westinghouse E. & M. Company early in 1923. The diaphragm was made of thin aluminum and incorporated a number of coarse spirals for stiffening purposes; a balanced armature design was likewise resorted to.

The left-hand unit revealed in Figure 2 is a standard device of the Victor Talking Machine Company, being manufactured by the R. C. A. It consists of an electromagnetic balanced armature element similar to that used in the 100-A type of cone speaker with the exception that a tie rod actuates a small diaphragm in place of the usual cone apex.

These small diaphragms are of very ingenious construction, and in order to gain a better idea this feature is shown disassembled in Figure 3. It is made up of duraluminum alloy of approximately 2 mil. thickness. Because the material is thin and lacks stiffness, and mainly to obtain a larger effective area, about the diametral axis will be found several corrigations. Near the outer flat surface will be noted another series of tangential corrigations. This materially aids the diaphragm, moving not as a plain diaphragm but as a plunger—an important characteristic. While this end is attained at the lower frequencies, still operation is materially altered at the higher, as will later be shown.

The extreme outer edge of the diaphragm lies perfectly flat and is employed for clamping purposes. The balanced armature of the magnet system connects to the diaphragm by means of a spider, as shown, the spider arms being attached to the diaphragm proper by clamping, plus a small drop of wax. Incidentally, the same type of construction is employed in the mechanical reproducers of Victor machines.

While the complete Victor motor element is especially designed for working into a phonograph horn of a definite impedance, yet it will be found to give excellent results when used with other horn makes.

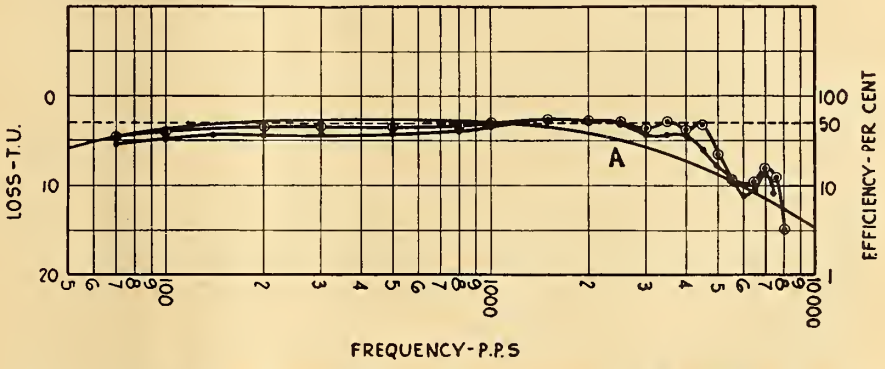


Fig. 4—Curves showing the flat frequency characteristics of Wente-Thuras unit.

The right-hand device shown in Figure 2 is known as the Western Electric Compand model 549-AW public address system unit. In construction it is much similar to that of the Victor just described, with the exception that its diaphragm is of slightly heavier stock. Since this unit is required for use in various in and outdoor installations, it is inclosed in a heavy waterproof casting, as shown in Figure 3, which also reveals its general internal construction with covering removed. Model 549-AW units are usually connected up in groups, employing impedance balancing networks, where the input power falls below 3 watts per speaker. Although the above described Western Electric Company and Victor Talking Machine Company units are without a doubt about the most scientifically built devices suitable for properly designed horns, it so happens that these elements are not generally available to the average radio set owner.

However, several other manufacturers have also gone into the production of somewhat similar devices. In this field are the Ben Brown Company of East Orange, N. J.; Utah Radio Products Company and Temple, Inc., both of Chicago. These several units are standard products selling at quite reasonable prices.

All possess excellent electrical charac-

(*Continued on page* 16)

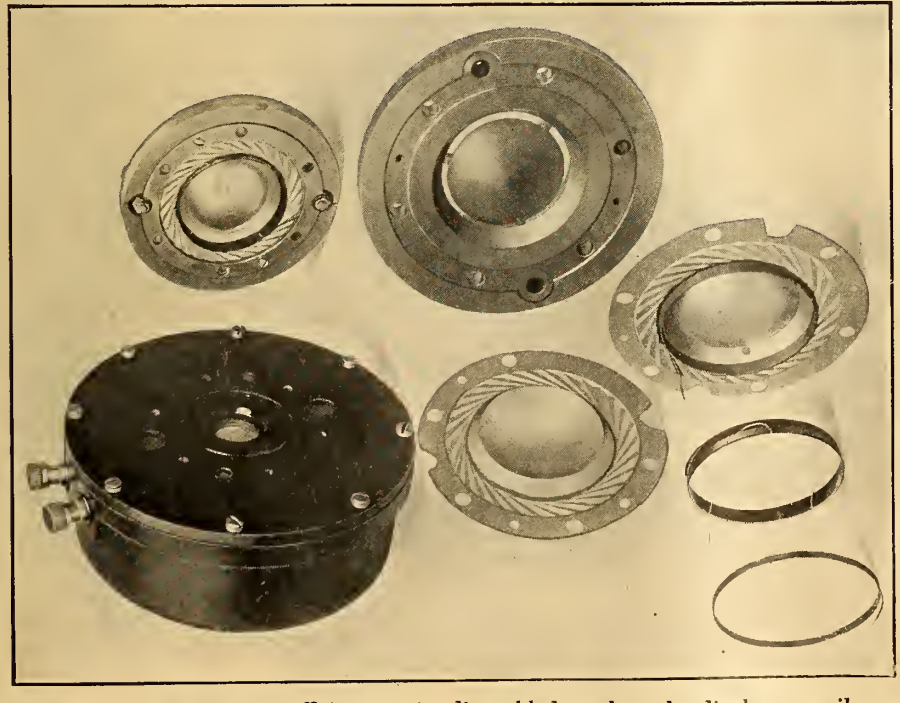


Fig. 5—One of the high efficiency units dissembled to show the diaphragm coils and mouthpiece.

Storage Batteries and Charging Circuits

II

By NAT. H. HEWITT
Local 306

THEORETICALLY, we should be able to draw the same quantity of current from a storage battery upon discharge as is put into it on charge; but practically this cannot quite be done. The plates of the battery must be given an occasional overcharge to keep them in good working condition—that is, there must be put into the battery under normal conditions a greater quantity of current than is taken out of it.

Amperehour meters are constructed to take care of the required overcharge automatically by a device known as a resistor. Briefly, this resistor causes the pointer of the amperehour meter to move to the zero position of the scale from a given higher reading at a slower rate than that which brought it to the maximum reading, thus giving the requisite overchange.

But, with all this the readings of the amperehour meter cannot quite keep pace with the state of the storage battery, hence it is necessary from time to time to move the pointer of the meter from the zero position to a reading corresponding to from 20 to 50 amperehours, after which the battery is placed on charge until the pointer returns to the zero position.

How to Determine Polarity of Charging Generator

Mention has been made of the fact that during charge the positive pole of the batteries must be connected to the positive pole of the dynamo. The polarity of the charging mains may be determined in three ways:

1. By a direct current voltmeter of the magnetic type.
2. By an electrochemical polarity indicator.
3. By dipping the terminals of the dynamo in a glass of plain or salt water.

Direct current voltmeters with magnetic mechanism have a (+) and (—) mark on the binding posts. If the meter is connected improperly to a source of direct current, the pointer, instead of swinging in the direction of the full scale position, will move to the left of the zero position; but when connected properly, the pointer moves from left to right. The wire of the dynamo connected to the (+) binding post of the voltmeter is the positive wire, and the other is, of course, the negative wire.

Chemical polarity indicators have a solution of iodide of potassium mixed with starch and sealed in a glass tube provided with terminals. When connected to the terminals of a charging line, current flows through the liquid and decomposes the solution, turning the positive terminal of the tube blue.

The polarity of the charging source may be ascertained by dipping the terminals of a d.c. line in a glass of plain water or, perferably, salt water. Bubbles will appear at the negative terminal of the line. The negative wire should be connected to the negative pole or terminal of the battery.

Keeping Level of Electrolyte

There is no loss of electrolyte in the charge or discharge of a battery, except the loss due to spraying. The acid does not evaporate, but the water does. Hence, from day to day enough water must be added to keep the electrolyte at a level of from ½ to ¾ inches above the plates. Of course, if sufficient water is contained in the cell, water should not be added. However, this should be determined by *daily inspection.*

The matter of replenishing the water supply is very important and in hot climes must be given more attention than in temperate zones.

Protecting Cells from Acid Spray

At the completion of the charging process all cells should be wiped thoroughly, first with a damp cloth and then with a dry cloth. Surface leakage of the current is thus prevented. Several other methods of wiping have been advocated of late, but experience has proven the efficacy of the method stated above.

The cells should also be protected from salt spray, the accumulation of dirt and dust, etc. Contacts and connections must be kept scrupulously clean and should be thoroughly examined from time to time.

The following are important points to remember

1. Keep flames of all kinds away from the battery at all times.
2. The best time for adding water is just before charging.
3. Do not use metallic receptacles for holding the water.
4. Every day *read and record* the specific gravity of the pilot cells, preferably at the same time each day.
5. Change off on pilot cells every week.
6. If the gravity of any cell shows a marked falling off relative to the rest of the cells, promptly investigate the cause and correct it.
7. Keep everything about the battery clean and dry.
8. Keep all terminals and connections tight and free from corrosion.
9. Do not allow any impurities to get into a cell.
10. Add only distilled water to the batteries.
11. Never use batteries right after charging, because of gasing for a few hours after charge which causes a crackling sound in amplification.
12. Never spill any solution on top of the batteries.

Questions on Storage Batteries

FOLLOWING is the first group of a series of questions on storage batteries which will appear in these columns from time to time. These questions cover principles of storage battery operation and maintenance which have been explained in detail in previous issues and are intended as a test to determine for your own satisfaction how well this information has been presented to and absorbed by you. Test your knowledge on this subject by these questions. The answers will appear in the next issue.

1. What is meant by specific gravity of electrolyte in a storage cell?
2. What is the normal voltage of a lead cell fully charged?
3. What is meant by the capacity of a storage cell?
4. What is meant by the normal rate of discharge of a storage battery?
5. How do you keep the quantity and the specific gravity of the electrolyte correct?
6. What kind of water is used in storage cells?
7. Name two distinct types of storage cells, and state the precautions necessary to keep them in good condition.
8. Without a hydrometer, amperehour meter, or any sort of indicating instrument whatsoever, how may one determine when the charge of a storage cell is complete?

A Projectionist Addresses the Exhibitors

IN order that you may understand more clearly just what my purpose is in talking to you today, I am going to ask you to think of yourselves for a few minutes merely as buyers of commodities for your personal or business use. As buyers of merchandise you are not greatly interested in the efforts the manufacturer has taken to perfect his article if for any reason the retailer delivers it to you in damaged or imperfect condition. You expect quality to be maintained.

Publix Theatres are retailers of public entertainment and every department of our company is organized to maintain and improve quality. Ordinarily we are not concerned with the problems of manufacture prior to delivery at the theatre, but we are very much interested in everything that concerns the presentation of the entertainment to the public.

Publix Theatres has sent me up here in the hope that what we have learned in connection with sound pictures may be of some assistance to you.

The Human Element

When you have had the equipment for the presentation of sound or synchronized pictures installed, you must realize that it is not automatic in its operation. In addition to the mechanical and electrical equipment, the human element must be seriously considered. If you wish to make this investment pay, as so many have already done, you must present this new form of entertainment to your patrons in a most credible manner.

Publix Theatres instructed Mr. Harry Rubin, Supervisor of Projection, to organize a staff to take care of this situation. I am one of his staff and it is my duty to take care of some of these problems which are continuously arising.

Preparatory to installation, the sound engineer comes to your theatre and makes certain recommendations in order that you may have perfect reproduction; these should be carefully weighed and not cast aside. If their views and yours do not coincide, you can talk it over and a mutual agreement can be arrived at.

Your projection staff should be given your cooperation, so that they may receive instruction in the proper handling of the equipment. You must see that they obtain full information and you must offer encouragement.

Cooperating with Projectionist

It is our aim to give them information on the methods and principles used so that the projectionist's mind will be in a more receptive mood to absorb any future knowledge he may gain on the subject. In other words, we expect them to know enough about sound equipment to put in a 100 per cent performance. In the event of a breakdown, we expect them to make temporary repairs or adjustments necessary to keep the show running, leaving the permanent repairs to the engineers of the company who have installed the apparatus. We do not mean by this that they are to tear down or take any of this equipment apart just to see what is inside.

In these 36 pages, containing between 15 and 20 thousand words (here Mr. Miehling exhibited a sheaf of papers), are the essence of the talks I am delivering to the projectionists of Publix Theatres throughout the country. I am going to turn the pages as rapidly as possible and give you a few comments on the high spots which will indicate to you how much lies back of maintaining the quality of sound reproduction.

THE accompanying article is the text of an address delivered at the recent Toronto Convention of the Motion Picture Theatre Owners of America by Mr. Rudolph Miehling of the Projection Department of Publix Theatres. This invitation to Mr. Miehling marked the first time in the history of the M.P.T.O.A. that a projectionist was asked to address one of their Conventions.

Mr. Miehling, a graduate engineer and a projectionist of long and varied experience, is assistant to Harry Rubin, Supervisor of Projection for Publix Theatres, and his work includes the dissemination of information to members of that company's projection staff on the best methods of presenting their shows,—with particular emphasis on sound programs.

Some person must be trained to judge the volume and quality of sound in the auditorium during the performance. While it is a fact that the projectionist has a monitor horn in the projection room, he is not able to judge how the sound is coming through.

The correct distribution of sound throughout your house is of vital importance and should have your careful attention. The proper draping of the horn units to keep the sound in the direction you wish it to go and no other is another important item.

Auditorium Defects

If your auditorium is of such nature that any continued interfering sound makes a condition which is annoying to an audience, this condition must be removed. The usual defects of auditoriums are three, namely, echo, dead spots and reverberation. Each has its particular method of elimination, and for pleasing effects the fullest attention should be given.

During my travels for Electrical Research Products, Inc., I have seen projectors in such bad condition that it was a wonder to me *that any film ran through them.* When I suggested overhauling, the management just threw up both hands. Here was a man investing thousands of dollars for sound equipment and when the matter of a small expenditure came up he was horrified.

Much Bad Equipment

Your present projection machine mechanism should be thoroughly overhauled or, if necessary, replaced with new equipment. Doing this will give you smoother operation and will eliminate stops, damage to film and other defects which can be attributed to this neglect.

I have enumerated just a few of the major problems which will confront you. Each must be taken up and solved so that this new phase of the motion picture industry will enjoy all the benefits which may accrue and to which it is justly entitled.

If you do not do your part and inject yourselves wholeheartedly in this proposition, you will be the one who will suffer. Publix Theatres have analyzed this sound situation and are acting accordingly. Each department has its particular function to perform, and Mr. Rubin's department is responsible for the proper presentation of sound and visual projection.

I am continually traveling over the entire circuit checking-up on this and that, calling the projectionists together and giving them detailed instructions on maintenance and operation.

Publix is working in conjunction with the Service Department of the company who installed the equipment and is also training its own staff to make emergency repairs to keep the show going in the event of a stoppage. I think it will be to your best interests to ponder well on the facts I have given you so that you may all enjoy the benefits of this new phase of the motion picture industry.

RCA—FBO—KAO Combine

The Radio Corporation of America which, through formation of a holding corporation will assume control of FBO and the Keith-Albee-Orpheum circuit of theatres, is reported as being on the lookout for more theatres to add to their already formidable nucleus.

The deal is seen in well-informed circles as a dovetailing of radios, pictures and vaudeville into one, with all three branches being used, when necessary, to aid the other. The need for outlets for RCA sound picture equipment is also regarded as an important factor in the deal.

As The EDITOR Sees It

¶ *Advertising*

RATHER a peculiar subject, perhaps, to tackle editorially in a paper devoted to the advancement of knowledge of projection technique. But it must be remembered that the function of this paper is not only to relate theories and experiments in projection that are worked out in laboratories and advanced projection rooms, but also to place before our readers a full explanation of the latest developments in the machinery of projection that are placed on the market from time to time.

To place emphasis on only the technique or theory of projection would be rendering our readers an altogether incomplete service and we would be failing to render them the service which, from the point of view of the immediate moment, was perhaps the most important of all. After all, a better knowledge of the tools with which the projectionist contends daily will help him at once to elevate himself in the eyes of his employer and before the public, which redounds to his material and moral benefit in his career. That seems to us so important that it leads us to discuss the place of the advertising columns of this publication in the projectionist's scheme of things educationally.

It is our belief that the advertising in this publication should be read as attentively as the straight editorial pages. In the very nature of things, the editorial matter must always be more or less a theoretical exposition of the functions of projection instruments—that is, an explanation of parts, how and why they operate as they do, possibilities of extracting functions from these instruments that may lie outside of the individual projectionist's experience, etc. But in the advertising section there is no theory—but a cold statement of fact of the values of all types of equipment in use or just marketed with which the projectionist may experiment and on which he may try out the theories set forth editorially.

¶ *Barometer of Progress*

ADVERTISING is the most contemporary thing in the world. A machine will be displayed before you by the manufacturer only as long as it retains its usefulness in its particular field. During this time it is of the greatest importance that the projectionist study it closely in the advertising, provided he has no such machine in his projection room, getting acquainted for that time when he will want or will get such a machine. There is no fear of being attentive to equipment which has passed out of date. As soon as a better piece of equipment performing the same function is placed on the market, the old is withdrawn at once, either to be revamped to meet competition or withdrawn altogether.

There is a natural law that provides for the above. Nothing is advertised unless it fills some function, and as soon as it fails to perform that function satisfactorily it is withdrawn from the market. Thus, there is no time wasted by anyone in studying the advertising that it is placed before him in his publications. A study of the advertising as it appears in this publication from month to month is an education, and I do not hesitate to advise all our readers to make this as much a part of their enjoyment of this paper as a reading of the editorial sections.

¶ *"New and Better" the Slogan*

NEVER before has there been as much interest displayed in projection equipment as there is now. Never before has there been such a variety of improvements brought out on old equipment and such a variety of new equipment. Rarely an issue of this publication passes but we are able to announce something new. Companies, never before interested in the motion picture industry, whose activities were in widely separated fields, are announcing new units of projection room equipment. To mention only a few, several new safety devices are on the market, several new generators are shortly to be announced, several new types of lamps are ready shortly to burst into public notice; there are all kinds of devices, not yet announced, waiting for the right moment to come forth, such as an automatic splicer, film cleaner, rewind eliminator, etc. It is really a dazzling prospect; and much of the pleasure comes from studying these instruments as they appear from time to time in these and other pages.

It is my contention that one of the wisest things a projectionist could do is to build up for himself a small but useful library of information which he can have at hand for immediate reference. Apart from the necessary books on the technical side of projection, one of the most important sections of this library should be a complete collection of catalogues and other material ready in the office of the different manufacturers to be mailed out to you upon your request.

Keep up with equipment as well as with theory. One without the other, from the angle of education, is like building a house on a foundation of quicksand.

And do it now! Get acquainted with the advertisers. Turn to the pages now. Study them. Write to each one for more information—it is impossible to put everything in an advertisement.

Boone Mancall

Light-Sensitive Cells

II: The Photo-Voltaic Cell

BY SAMUEL WEIN

IN the last article the writer described the photo-electric effect and the photo-electric cell. In this issue he will describe another form of light-sensitive cell—the photo-voltaic cell and its photo-voltaic effect. The photo-voltaic effect is the least known among light-sensitive phenomena and has received the least attention of investigators and experimenters. This is due primarily to the fact that this particular phenomenon is very little understood, by comparison with other light-sensitive actions.



A typical form of photo-voltaic cell, by Wein. This consists of two metal plates (a special alloy), immersed in a solution which acts as a conductor between the plates.

Definition: Becquerel, who first discovered the photographic effect of radio-active materials, in the middle of the last century found out that if two Daguerreo-type plates were immersed in a trough of water, and if the plates were directly connected to a galvanometer, if one of the plates were exposed to a source of light—the other being dark—a deflection on the meter would be recorded, showing that a potential (current) was generated. In honor of the discoverer of this phenomenon the effect is sometime called the "Becquerel effect" as well as the photo-voltaic effect.

On close examination of this phenomenon one will observe that there really is a light-sensitive battery in its most elemental form. In other words, on exposing one of the elements in the cell a source of current is generated; and if no light is permitted upon one of the plates, no current is generated. Here we have a chemical action taking place between the plates as a result of light exposure on one of them, and as a result of this chemical action a source of current being generated which is readable on a meter.

Since the discovery of this effect a great number of contributions have been made to the knowledge of photo-chemistry, but this is only of an academic nature and of no present practical consequence. Various metals and combinations of metals, as well as alloys, have been tried, including various electrolytes (solutions), which have been recommended from time to time. These metals and electrolytes give rise to different chracteristics natural to the metal and electrolyte used.

Compared with P-E Effect

The photo-voltaic effect is different from the photo-electric effect in that with the first-named a source of current is generated as a result of light, requiring no extraneous sources of current to actuate external devices; whereas, with the second type of cell we have a different sort of action, i. e., a source of electrons being thrown or torn off from the surface of the cell as a result of light exposure. In this latter case (photo-electric), a source of potential is always required in its circuit.

Were I to attempt to describe the various metals and electrolytes used I should require a number of editions of this publication devoted exclusively to this particular subject. However, the general facts are what we are now concerned with, and it is these which we shall consider.

Silver plates or foils have been employed with success. The surface of the metal is usually converted into a salt, a form of hyper-sensitizing (described in the last issue), such as the corresponding sulphide, bromide, chloride, iodide, or oxide. The solutions found to give the best results are potassium bromide, chloride, iodide, sulphate and barium nitrate. A number of dyes have been found which function very nicely with these silver plates, among these being eosine, fluroescein, rhodamine, etc. In some instances, alchol, acetone, glycerine and other solvents have been found to be as satisfactory as water, the electrolyte.

In the place of the silver and the tin, which we are acustomed to find wrapped around our candies, the use of water as the electrolyte gives rise to photo-voltaic cells. It must be remembered that the tin foil must not contain lead or antimony in it as an alloy. Instead of plain water, the different dyes described under the silver types of cells may be used here. Antimony against an alloy of antimony and a small percentage of selenium, in conjunction with antimony trichloride and free hydrochloric acid, gives rise to light-sensitive elements.

If two aluminum plates are inserted in acetone, and if one of these plates is coated with selenium, it will be found to give a good sensitivity to light. Instead of aluminum plates, those of platinum are found to give better results. The film of selenium must be even throughout.

Recent Improvements

The magnitude of current available from the older forms of photo-voltaic cells is very small indeed, so much so that extremely sensitive meters were used to measure these minute currents resulting from light exposure on the plates. The writer has developed a newer photo-voltaic cell, using a special alloy and coated with a special compound on each of the two metal plates which, when combined with a new form of electrolyte, results in the cell having a greater output than has been possible heretofore with this type of light-sensitiye cell.

As a matter of fact, it has been possible to get as much as 25 millivolts and up to 1½ millamps from this particular cell as a result of light exposure. This form of cell, which is known commercially as the Wein Rayfoto Photo-Voltaic Cell, is much more sensitive for weaker light illuminations than other cells of its order. I have intentionally omitted details of my cell form in view of the pending patents now in the United States Patent Office.

The first commercial form of the photo-voltaic cell is now available at a sufficiently low price for the average consumer and experimenter from the Radiovision Corp. of New York City. The form of the cell is shown in the accompanying illustration.

The photo-voltaic cell is fast becoming a popular light-sensitive cell with workers in the talking motion picture field, in the wire and radio transmission of pictures (television), and for actuating electrical circuits by means of a ray of light.

In the next issue of this publication I shall describe another form of light-sensitive cell which is known as the "actino-electric effect," in which crystals change their ohmic (resistance) value with the variations in light.

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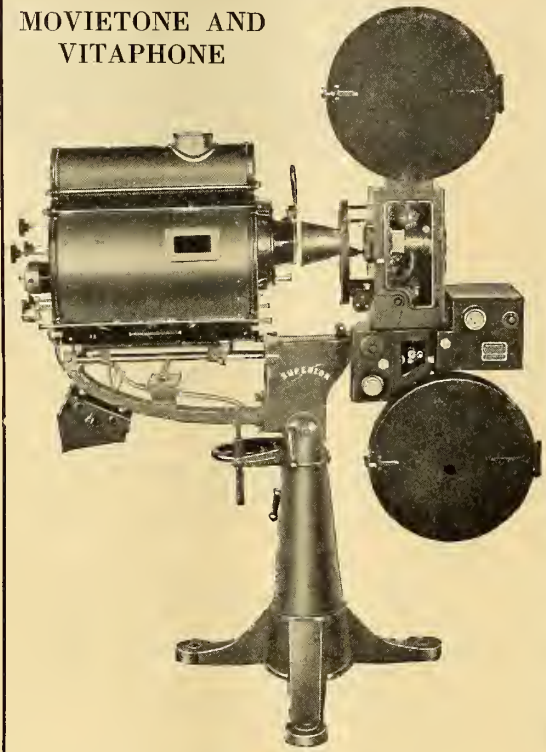
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Exclusive Distributors—Superior Projectors, Strong Reflector Arc Lamps and Roth Generators in the Lone Star State.

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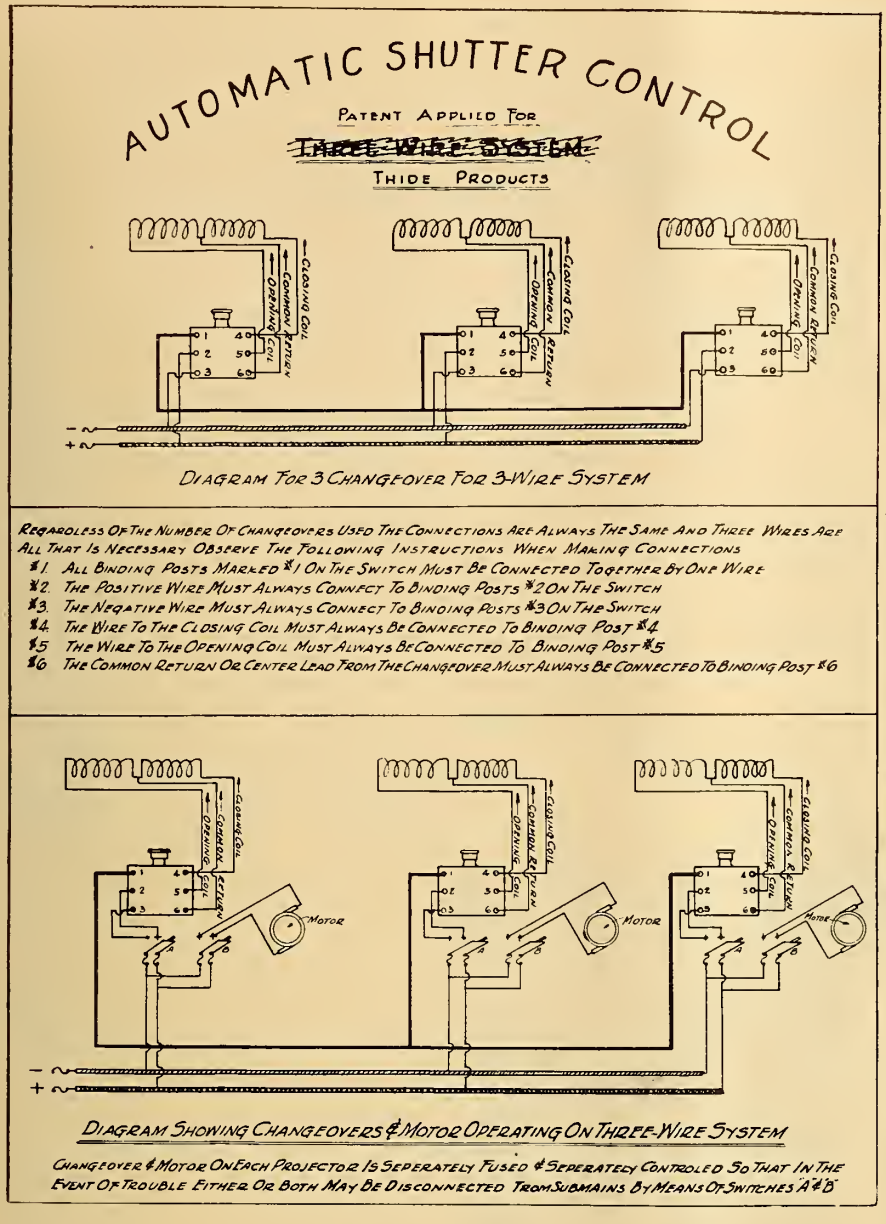
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Three-Wire System For Thide Changeover

ABOVE is illustrated the wiring diagram to be followed when using the recently developed Thide foot-switch. This switch is being introduced by Charles S. Thide, inventor of the Automatic Shutter Control, and to be known as the "3-wire circuit miniature power house."

The wiring system constitutes a radical departure from all known former methods, in that it requires only three wires for a uniform installation, regardless of the number of changeovers used. The use of this foot-switch enables the simplest installation and assures the greatest efficiency and dependability in the changeover operation.

Device Has Many Distinctive Features

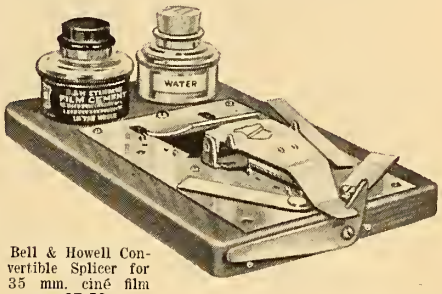
Following are the distinctive features in both the mechanical and electrical construction of the switch:

All contacts are wire contacts and are sufficiently large to carry more current than will ever be needed. The entire switch mechanism is mounted on a panel which has binding posts to which the wires may be fastened, thereby eliminating soldering and splice boxes.

It has a rapid-break contact in the power lead which prevents arcing and prolongs the life of the switch. A new and highly efficient insulating compound covers the interior walls of the switch, eliminating any possibility of grounding.

The electrical features of the switch coupled with the mechanical construction, which embodies the very latest features, makes the product highly efficient and durable.

A compact —accurate Hand Splicer



Bell & Howell Convertible Splicer for 35 mm. ciné film —$7.50.

PROJECTIONISTS find that the Bell & Howell Convertible Film Splicer is a compact, accurate, hand splicer making a neat, clear, imperceptible splice in perfect alignment. It is quick. It is sure. It is handy—can be placed on a shelf or table and occupies very few square inches. It fills the splicing needs of the projectionist.

The splicer is provided with its own cutter which shears the film in exact register for scraping and joining. It is neatly mounted on a suitable base and is equipped with a bottle of cement, water bottle with cork and brush for applying moisture to the emulsion surface to be scraped, and scraper blade.

Other models up to $450.00.

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Chicago, Illinois

How Many New subscribers have you secured for THE MOTION PICTURE PROJECTIONIST? Introduce your friend to the craft's only paper. Take advantage of the present low subscription rate—$1.50 per year.

Motor Elements for Exponential Horns

(*Continued from page 9*)

teristics and are built with full appreciation of the problem. The Temple element is somewhat unique, since its corrigated alloy diaphragm is so designed as to work into not only the horn throat, but its reverse face tends to radiate the higher note frequency directly through a grilled opening of the casing. The latter feature also eliminates excessive diaphragm damping—a design similar to the Victor unit.

Many New Designs

Ben Brown of East Orange, N. J., the engineer of B. B. L. device units, has recently completed designs of a new horn unit which in all probability more fully incorporates the desired features of scientific development. This unit, like the Temple, is probably one of the best available. While there are a number of other drive mechanisms at present on the market, nevertheless, the writer doubts their utility and efficiency.

If one goes into the purchase or makes a large exponential horn the expenditure of funds and time is hardly warranted unless the most modern designs of drive unit are incorporated. Unless one looks at the loud speaker problem from this angle it will be found that cone type speakers shall invariably give best reproduction with compactness and neatness of appearance.

The above described electromagnetic horn type drive units are probably among the best designs today available. And while all attempts to arrive at a diston movement of diaphragm displacement, yet a more recent design of motor drive developed by the Bell Telephone Laboratories conclusively show a large improvement of both efficiency of operation and a more perfect frequency response characteristic may be obtained.

Common Faults of Horns

A principal fault with horn type speakers employing the receivers previously described lies in the fact that, regardless of the nicety of horn development, the use of proper ratios of expansion, and, finally, the realization of low cut-off frequencies, is not so much making possible the generation of these low audio frequencies, but rather how to prevent the suppression of frequencies much above 3,000 cycles. In other words, it is the higher audio notes and harmonies, lending timbre to reproduction, which are lost.

Such conditions are generally brought about in the usual types of design by the annular area of the sound chamber (distance between diaphragm and horn clamping cap) and the movement of the diaphragm proper. The latter, experiment shows, moves not as a plunger, but rather its displacement is paraboloidal. It can be shown that a diaphragm slightly over one and one-half inches in diameter and having an air chamber with an annular area which is approximately equal to the horn throat area, that no sound would be emitted at 4,000 cycles.

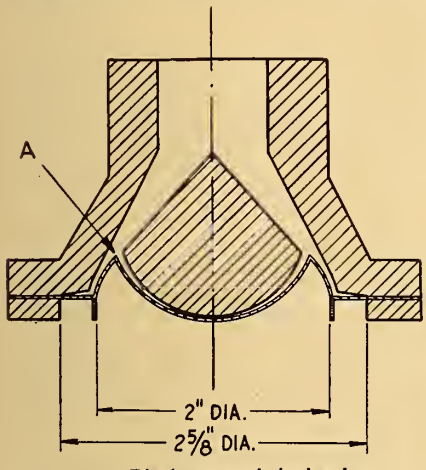
In most cases the higher note frequencies are further reduced by the fact that the mode of motion of the diaphragm changes with frequency. This interesting

phenomenon was recently shown by E. C. Wente and A. L. Thuras in the Bell System Technical Journal, January, 1928.

Excellent Bell Development

As a result of much research work in this field Wente and Thuras of the Bell Telephone Laboratories developed an electrico-dynamic or floating coil type drive motor element for horn speakers which possesses a practically flat frequency characteristic between the range of 50 to 5,000 cycles, as shown in Figure 4.

And, in addition, these units, which are believed to be commercially known as the Western Electric Company type 555-AW models, have a conversion efficiency from electrical to sound energy varying between 10 and 50 per cent. in the frequency range of 60 to 7,500 cycles.



—Diaphragm and air chamber.

Fig. 6—A cross sectional view of the new floating coil type unit having a high sound efficiency.

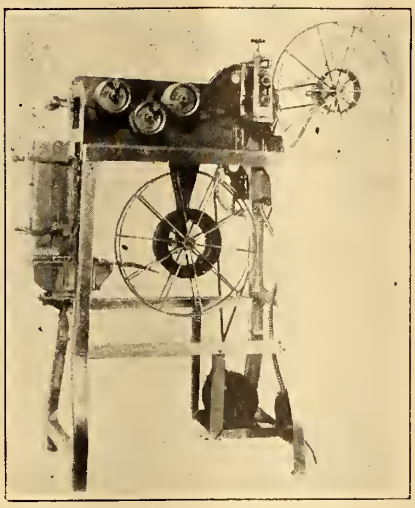
The last remarks may not be fully appreciated until one remembers that average cone or horn type electro-magnetic speakers seldom have efficiencies exceeding 1 per cent!

A further development found in these units is that the design calls for electrical input rating up to 30 watts, as compared to 5 watts for the better or present-day dynamic speakers, and approximately 3 watts for cone speakers.

The photograph Fig. 5 reveals the complete assembly and component parts, diaphragm, armature, coil and mouthpiece of the Bell Laboratories development.

From the latter remarks it is apparent that with a fifty-fold increase in efficiency, together with five or six times the input power, this type of receiver is capable of outputting in the form of sound energy from 250 to 300 times the power of nay type of similar apparatus heretofore available.

These new motor drive units are incorporated in Vitaphone and Movietone talking moving picture installations. When used for broadcast reception in conjunction with any high grade horn having a reasonably low cut-off frequency the immediate reaction one receives is that the audio amplifier system has been greatly enlarged, which results from the high output or sound conversion efficiency. Of course, the longer frequency response spectrum likewise shows a vast improvement in tonal quality and all around reproduction.



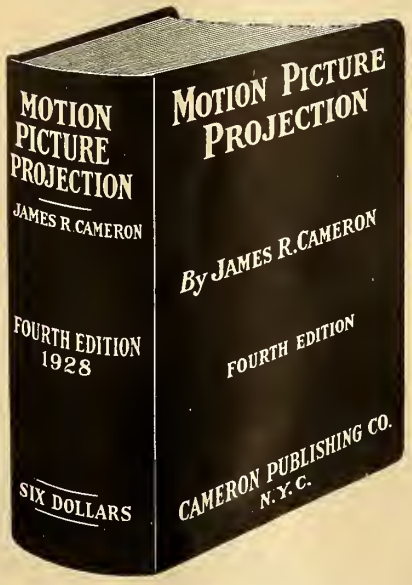
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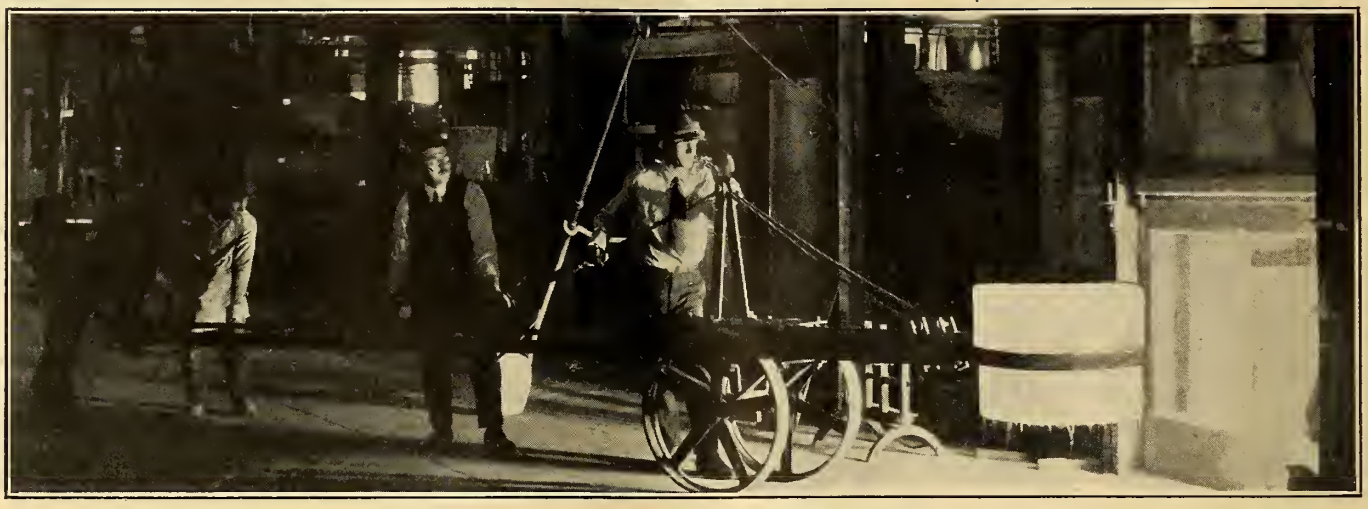
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Taking a pot of molten glass from the furnace

A Trip Through Lens-land

By EARL A. ROGERS
Bausch & Lomb Optical Company

A PROPER appreciation of the meticulous care, skill and experience that go into the production of the Cinephor projection lenses can only be obtained by a trip through the great factory of the Bausch & Lomb Optical Co. at Rochester. Recently about forty delegates to the Rochester Convention of the New York State Association of Projectionists made this trip and were so impressed by what they saw that many of them requested the story of the things th y saw and heard for the benefit of those who were not there.

Such an expedition, of course, includes both visual and oral information—the observation of manufacturing processes and the explanation of them. The following story will include both pictorial and verbal illustrations in the interest of a connected narrative.

The actual work in the production of a series of lenses like the Cinephors begins many months before the product is completed, with nothing more tangible than a pencil and a piece of paper. The problem is first put to the lens designer, who, after a long period of research, determines all of the factors which must be considered in designing the lens.

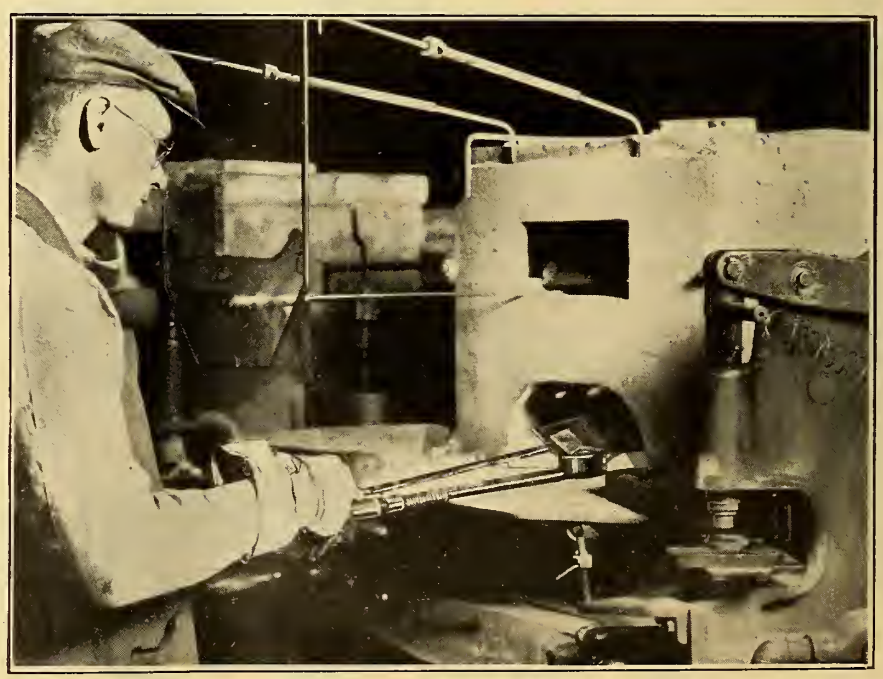
Essential Characteristics

A projection lens, for example, must possess many essential characteristics. It must have critical definition all over the field. It must possess the characteristic known as flatness of field, which is the reproduction on a flat screen of the image of a flat object (the film picture). It must transmit the maximum amount of illumination so that the pictures on the screen will be sharp and brilliant. Also, it must be fully corrected for color so that the black and white areas will offer a definite contrast and the sharp edges of these areas will not be fringed with color, thereby destroying the definition of the image. Furthermore, all of the different focal lengths, projection distances, different types of illuminants and many other factors must be taken into consideration so that the finished product will measure up to all these conditions.

The lens designer then takes all of this various data, mixes it up in his mathematical kettle, adds a few logarithms, stirs constantly all the time with a slide rule and at last evolves, after much simmering, a result in the form of a few pages of formulae which look to the layman like nothing more—just a few pages of formulae. In the case of the Cinephor projection series there is a separate formula for each of the different series, 1 and 2, for each quarter-inch focus of each series. A demonstration of the effectiveness of this procedure will be seen later when we come to the story of how these lenses are inspected.

Completeness of Formula

The formula produced by the lens designer contains information in regard to the various kinds of glass which go to make up the different lenses. It contains data on curves and thicknesses for the benefit of the lens grinding department, data and information such as the centering, mount-



Placing the heated and plastic glass into the mold just prior to pressing the rough blank in the press shown at the right

ing and spacing of the lenses in the metal cells, for the benefit of the Assembly Department, and tolerances which must be observed by the inspectors in their final check-up of the finished lens.

In the first place, a survey is made of all the available glass which may be used in making up the lenses. In the years in which our Glass Plant has been functioning a vast supply of many different kinds of optical glass has become available, so that it is quite likely that the particular kind of glass specified may be found in our stock. Only a slight variation of one or two of the optical characteristics, however, would require an entire new computation of the lens formulae and would in most cases result in a finished product slightly inferior to that of the ideal formula originally given by the lens designer. For this reason it has been found advisable to meet the conditions set down by the lens designer exactly, and if the proper glass is not to be found in stock, new glass is made conforming exactly to the optical characteristics required.

The Scientific Bureau

Checking and inspection of the optical glass is under the supervision of the Scientific Bureau, which uses the most precise forms of optical scientific apparatus for the exact determination of all the characteristics necessary in the make-up of the lens. Only when all these conditions have been met does the Glass Plant go ahead and make up pressings or blocks which are held to approximately the same thicknesses and curves which the final lenses will take on. These pressings are then forwarded to the Grinding Plant where the process of manufacture is continued.

Here the glass bodies are mounted on large shells by means of pitch or wax and are ground against other shells with various grades of emery or corundum in between. The curves, at first, are roughly formed, later trued and smoothed with finer abrasives until the finished grinding produces a surface smooth as velvet, so even and true that not the slightest flaw can be found with strong magnifying glasses. The finer and more accurate the grinding process has been the easier will be the finishing process.



One of the B. & L. lens-grinding rooms

Polishing is done by running the blocks containing the glass lenses which have been ground against a pad of wax, this time using iron oxide or rouge mixed with water to form a thin paste. This process is continued until the surfaces take on a beautiful luster, entirely free from all pitch or scratches and able to withstand the close inspection of experts using a high magnification lens.



Centering a lens so that it can be perfectly aligned in the lens system

At this stage the first check as to the accuracy of the curve is made. Glass lenses known as test lenses which have been ground together until they fit perfectly and conform exactly to the prescribed curvature have been made and one-half of this lens is placed against the lenses on the block. By observing the colored Newton rings which are caused by the interference of various wave lengths of light in the almost inconceivably thin air space between the test lens and the lenses, it is possible to determine the exact curvature of the lens with relation to the test lens. Any slight variation of curvature causes the rejection of this particular block and they must be put back on the polishing, or both the grinding and polishing machine, and resurfaced until a perfect fit is obtained. It is possible by this method to measure the accuracy of curvature of the lenses to a few millionths of an inch.

Checking for Accuracy

Fully as important as the surfaces in securing the maximum efficiency of correction of which the lenses are capable, is the centering of the lenses with each other. This is done by experienced operators working on special machines. These machines, in general, are the same as those used for our finest photographic lenses, ophthalmic instrument lenses and other precise optics. Every Cinephor lens has at least one cemented element; that is to say, two lenses cemented together to form a single unit of the lens. The centering must be so perfectly accomplished that the edges of these lenses and the optical centers are in exact alignment and will give a perfectly

(*Continued on page 22*)

Needed Every Day!

An Exact reproduction of a column of a page from the Theatre Section of the Current Edition

STATE → NEW YORK
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SEATING CAPACITY

Crescent Theatre [1,200] ③ 15c & 25c
1175 Boston Rd.
Operated By—Joelson & Suchman of New York City which see under Chain Theatres.
Mgr.—Irvin Cohn.
Booker—Meyer Solomon.
Film Buyer—J. Joelson.
Purchasing Agent—Herman Starr.
Phone—Kilpatrick 7516.

INDICATES STRICTLY 1 ST. RUN HOUSE

Criterion Theatre [*2,200] $1. & $2.
Broadway & 44th St.
Operated By—Individual Pictures Corp., Paramount Bldg., N. Y.
Mgr.—J. A. Manning.
Phone—Bryant 7540.

Crotona Theatre [2,257] ② 25c & 45c
453 E. Tremont Ave.

SOUND EQUIPMENT IS STATED IN EACH LISTING

Run—Pictures, Vitaphone, Movietone & Vaudeville.
Operated By—Fox Theatres Corp. of New York City which see under Chain Theatres.
Mgr.—Mr. Heiman.
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Purchasing Agent—I. Krotosky (850 10th Ave.)
Projectionist—J. Caputo.
Phone—Tremont 5400.

NUMBER OF TIMES A WEEK PROGRAM IS CHANGED

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892 E. Tremont Ave.
Seating Capacity—1500 plus 1300 for Roof when open.
Operated By—G. S. & V. Corp. of New York City which see under Chain Theatres.
Film Buyer, Booker & Purchasing Agent—Jack Stillman (Congress Theatre, 554 Southern Blvd., N. Y.)
Purchsing Agent—Samuel Toregora (Congress Theatre, 554 Southern Blvd. at 149th St., N. Y.)
House Mgr.—Jos. W. Kligler.
Phone—Fordham 7163.

RUN VAUDEVILLE IN ADDITION TO PICTURES

Delancy (Loew's) Theatre [*2,500] ② 20c & 40c V & P
Suffolk & Delancy Sts.
Operated By—Loew's, Inc. of New York City which see under Chain Theatres.
House Mgr.—A. Gutterman.
Film Buyer—David Loew (1540 Broadway, N. Y.)
Film Booker—Fred Mitchell (1540 Broadway, N. Y.)
Purchasing Agent — Chas. Sonin (1540 Broadway, N. Y.)
Vaudeville Booker—Jack Lubin (146 W. 46th St., N. Y.)
Phone—Orchard 4971.

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Douglas Theatre
640 Lenox Ave.
Phone—Edgecomb 8012.

Dyckman Theatre [1,700] ③
552 W. 207th St.
Operated By—The Springer Circuit of New York City which see under Chain Theatres.
House Mgr—Mr. Luntz.
Film Buyer & Booker — J. W. Springer (Symphony Theatre, 2531 Broadway, N. Y.)
Purchasing Agent—Al Hamburger (Adelphia Theatre, 2409 Broadway, N Y.)
Phone—Lorraine 4422.

ADULT ADMISSION AFTERNOON & EVENING

Eagle Theatre [*1,200] ④ 15c & 25c V
1852—3rd Ave.
Operated By—Eagle Motion Picture Co., Inc
Officers—Wm Salkin, Pres.
House Mgr., Purchasing Agent & Vaudeville Booker—J. H. Phillips.
Film Buyer & Booker—J. H. Phillips.
Phone—Atwater 6171.

MOTION PICTURE TRADE DIRECTORY

A directory of the Industry presented in the most convenient form for ready reference by every Producer, Distributor, Theatre Owner or Equipment Manufacturer. 1,000 pages of Trade Facts that every progressive person in the Motion Picture Industry will want at his elbow.

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62½% Less Heat on the Film

ENGINEERING STAFF, ENTERPRISE OPTICAL MFG. CO.

SINCE the advent of the high intensity arc lamp, the reflecting arc lamp and, more recently, the high intensity reflecting arc lamp, an increasingly alarming condition has arisen through the additional heat impressed upon the film as a result of these high efficiency illuminants.

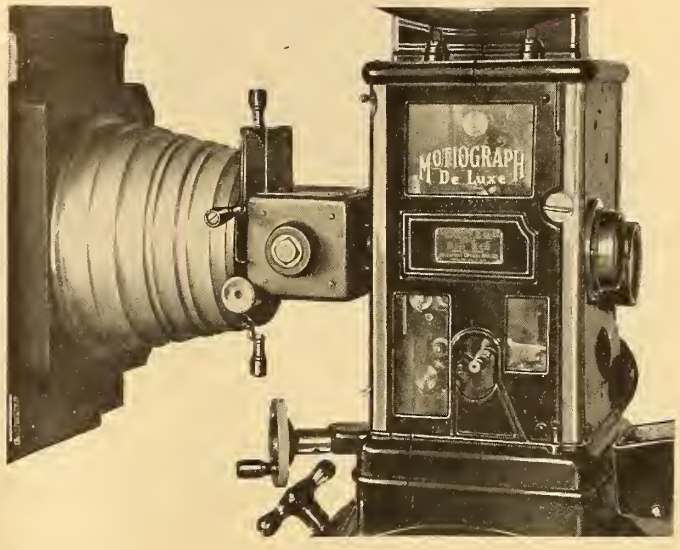
The necessity for some form of practical solution became evident through the complaints of projectionists to the effect that these forms of illuminants caused a buckling or warping of the film which seriously interfered with their efforts to project a picture in true sharp focus. It became more evident when film distributing companies reported that in many cases film had been returned to them from theatres using these high powered illuminants in a condition not suitable for re-showing and in some cases actually ruined.

In view of these circumstances, with which most of us are familiar, we began about two years ago to seek some practical solution of the problem, the result of which was the announcement to the trade some few months ago of the new Model "H" Motiograph DeLuxe Projector in which is incorporated what has been proven to be a practical solution of the problem of eliminating the heat from the film.

In seeking a solution for this problem consideration was given to all the known methods of heat dissipation, including cooling cells, heat absorbing filters, forced air and other devices, all of which offered no practical or satisfactory solution. The transposition of the ordinary disc type of revolving shutter positioned between the lens and the screen to a position between the film and light source was also considered and discarded. While it was found that this would have the effect of eliminating the heat from the film there was a tendency to increased flicker, which was objectionable due to positioning the shutter near the focal plane.

Cylindrical Shutter Selected

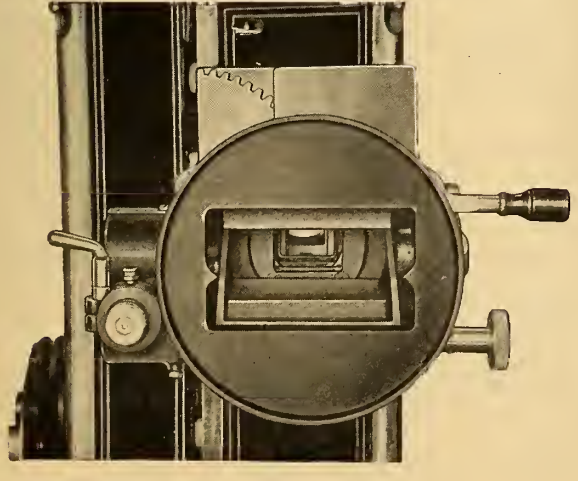
Without it being necessary to go into the history of the various types and formations of shutters tried out, it is sufficient to state that a horizontal, cylindrical type of shutter rotating on a horizontal axis and positioned between the film and light source was finally found to be the correct type and one that, while affording the all important function of eliminating the heat from the film, would not only permit the maintenance of the present standard of projection but would actually improve it.



Close-up of cone, shutter and mechanism.

The axis of the shutter is positioned four and one quarter inches from the film and the diameter is three and one quarter inches. The cutting blades of the shutter, of which there are two, are positioned around the circumference of the cylindrical casting forming the shutter and are equally spaced. The shutter having the appearance of a hollow cylinder with sections cut out, these cut out sections affording the passage of the light through the system.

Designing the shutter in cylindrical formation secured two distinct advantages for better projection. The position of the two blades being such that during the cut-off action the edge of the shutter blade nearest the film intercepts the light beginning at the bottom of the light beam and cutting off toward the center of the beam and near the focal plane. Simultaneously, the other blade intercepts the light beginning at the top of the beam and also cutting off toward the center of the beam. The blades being an integral part of the shutter casting, it will be readily seen that the first blade cutting off from the bottom of the beam and toward the center would take an upward course during the rotation of the shutter, and its cutting-off action would occur near the focal plane; while the opposite blade would take a downward course and its cutting-off action would be further away from the focal plane.



Close-up rear view of new shutter.

Shutter Blade Action

In the action of these two shutter blades, one cutting off near the focal plane and the other cutting off at a point further away, we obtain the first advantage in that, the edges of the cutting off blades functioning at different points in relation to the focal plane, we secure what might be termed a blending of the cut-off, which tends to eliminate the objectionable flicker of a shutter of the rotating disc type in which the blades of necessity would all operate during the cut-off action at a point in the same plane.

The second advantage is also a result of this cylindrical design of the shutter, in that the action of the two cut-off blades operating to intercept the light beam horizontally from the top and bottom simultaneously and across the narrow dimension of the aperture, a gain in efficiency is secured over the rotating disc type of shutter, which would operate to cut-off somewhat in a diagonal direction across the corners of the aperture. This gain in efficiency

(*Continued on page 26*)

Super-Lite Lens



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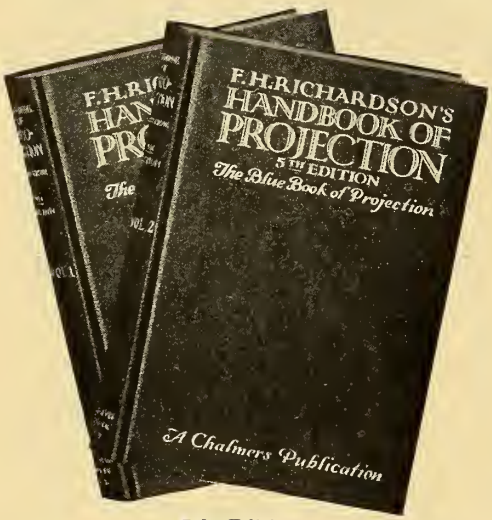
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Automatic Devices Co.'s New Curtain Track

OF particular interest to theatremen is the recent announcement of the Automatic Devices Co. of Allentown, Pa., with regard to their introduction of the Silent-Steel Curtain Track. Since the development of the hardwood Roll E.Z. track and its successful operation over a period of eight years, many changes have been made in stage design and equipment.

A demand has gradually developed for a curtain track retaining the best features of the Roll E.Z. type combined with smaller dimensions and greater strength in proportion to weight, qualities which are inherent with the use of steel.

After exhaustive tests and operation under actual working conditions of various types of equipment, Automatic Devices has finally succeeded in perfecting the new Silent-Steel Curtain Track for which is claimed an efficiency of operation far in advance of present similar equipment.

The new track is silent, strong, and durable, and is easy to install and easy to operate, whether by hand or with the A.D.C. Automatic Curtain Machine. The use of extremely accurate dies in the manufacture of track and fittings assure absolute precision and uniformity in quality and dimensions with consequent savings in production costs. These savings, assert the Automatic Devices Co., are applied toward a reduction of the purchase cost.

Complete information and data covering this new track may be had by writing to Automatic Devices Co. at Allentown.

A Trip Through Lens-land

(*Continued from page* 19)

centered image when a beam of light passes through them. The other single elements of the Cinephor are mounted in line with this cemented element and must be perfectly centered with it.

After being centered, the two elements are cemented together and then each lens in the entire assembly is wrapped separately in a piece of paper and sent to the Inspection Department.

In the meantime the metal cells, rings, etc., in which the lenses are to be mounted have been made in the mechanical departments. These must also be turned to an extreme degree of accuracy in order that the edges of the lenses may all line up properly. These parts, together with the optical elements are sent to the Inspection Department for the assembly to be completed.

The Inspection Process

Visitors are usually surprised at the extreme care and thoroughness with which this inspection operation is carried out. The lenses are assembled as they are inspected, that is, the lens cell is taken by the operator, the various lens elements are inserted and secured and then the entire assembly is put on the optical bench and an image is projected through it on a white screen. In this way any error in centering,

(*Continued on page* 31)

Sound Projection Problems

Paper by Harry Rubin, Supervisor of Projection for Publix Theatres Corp., Before the S. M. P. E.

THE title of this paper as originally submitted to the Chairman of the Papers Committee was "A New Method of Film Registration on the Screen," but by request was changed to the present one, "Some Problems in the Projection of Sound Movies." The matters discussed will, therefore, be chiefly considered as problems still to be solved.

The introduction of sound pictures necessitated the redesigning and reconstruction of projection rooms as the space allotted to this department is inadequate even in many of the newest theatres. It will be well for architects in future to be fully informed regarding the requirements of a modern projection room.

In many instances it was necessary to demolish walls which conform to fire regulations and construct new ones with similar restrictions. It is obvious that this meant much work, expense, loss of time and interference with the work of the projectionist.

Projectionist's Adaptability

The need for speed in the installation of sound equipment, and in many instances new projection equipment, constituted a real problem as no interruption or marring of the performance was permitted.

Another difficulty of a similar nature was training men for entirely new equipment under rush conditions without interfering with their regular duties. It is doubtful that except in times of urgent necessity any body of men has been called upon to take up the operation of entirely new and delicate equipment with so little preliminary training as the projectionist received in connection with sound pictures.

That he has done so well is a real testimonial to his technical ability and intimate knowledge of conditions in the theatrical field. The projectionist should have ample opportunity to study new equipment he is expected to handle as proper instruction is hardly less an engineering problem than designing the equipment itself.

In presenting the accompanying paper by Harry Rubin, Supervisor of Projection for Publix Theatre, before the recent Lake Placid meeting of the Society of Motion Picture Engineers, P. A. McGuire, of the International Projector Corp., made the following introductory remarks:

"It is possible that the problems or difficulties presented in this paper may seem too simple, too obvious, too general and too practical for consideration by the Society. But, after all, we are not a body of scientists interested solely in more or less abstract truths and theories but a technical organization with a very definite commercial background.

"It therefore seems to me that all matters relating to the delivery of the finished product to the public warrants the reasonable attention of this meeting."

Screen Development Needed

There is urgent need for the development of a screen which will permit transmission of sound without decreasing the reflective surface. Much of the advance that has been made in recent years in the manufacture of screens intended solely for visual projection has been lost through the use of screens now used for sound pictures to facilitate the transmission of sound.

Even with the best screens now in use for sound pictures there is a perceptible loss of light and it is to be hoped that this condition will be corrected at the earliest possible moment. The quality and quantity of the light is of the utmost importance to the projectionist and the condition here referred to is one of the most serious problems the projectionist faces at the present time.

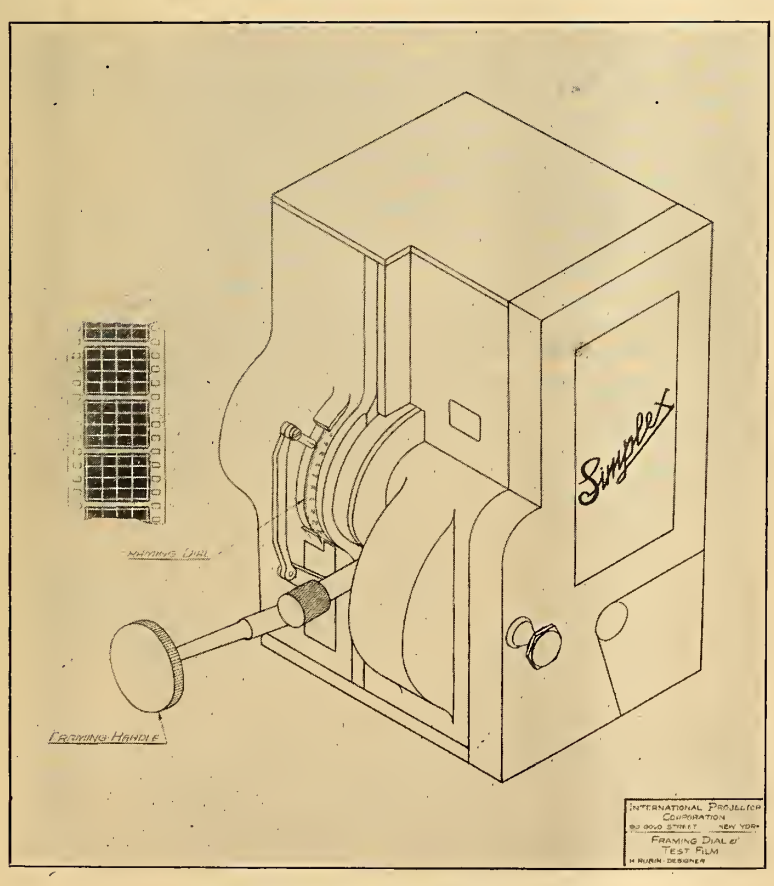
Sound volume is mechanically controlled from the projection room and, therefore, the elimination of vibration and extraneous sounds are naturally matters of real interest to the projectionist. Such difficulties while not the direct responsibility of the projection department must still be included among the problems of projection in connection with sound pictures.

The Changeover Problem

Changing from regular film to the Movietone film necessitates an alteration in the shape of the aperture and a new aperture mask has been designed and manufactured for this purpose. The sound track of Movietone reduces with width of the picture and to bring this back to the normal shape the height has been reduced proportionately. A change in the lens is also required to restore the picture to its proper size on the screen and a shorter focal length lens is used for this purpose.

It is not possible at this time to give complete details of the methods we are using to solve the problems of sound pictures in connection with sound movies, but we know that eventually they will be solved with the help of the manufacturers of equipment. The experience of the Projection Department and the increased skill

(*Continued on page 28*)



TEST FILM AND FRAMING DIAL
Designed by Harry Rubin and produced by International Projector Corporation.

How to Overcome Talkie Troubles

BY JACK WOLHEIM

Local 306

WE projectionists have had explained to us from time to time the functioning of the component parts of sound reproduction equipment—what it is, how it works, and the care required to maintain it in perfect operating use. But one angle of the situation has not, so far as the writer knows, been touched upon but briefly, and this point is the various difficulties which present themselves and the various troubles which arise under the practical operation of the equipment.

It is all very well to be schooled in the operation of the equipment; this is, of course, necessary. But it would also be well to know just what to do when in the course of presenting a show some unforeseen trouble arises which demands quick thinking on the part of the projectionist and quick action on his part to prevent that particular show from proving what may be best termed a "bust."

It is assumed, of course, that before projectionists are left in control of sound picture apparatus that they understand their duties well enough to put over a perfect show—providing nothing untoward happens. This article will not, therefore, embody any detailed description of the apparatus or the functioning of its component parts. It is designed to cover thoroughly the many obstacles encountered by the projectionist in presenting sound pictures and to offer a few hints as to the best procedure in each instance.

Audience First Consideration

The true test of a perfect show is, as we all know, the reaction it provokes from the audience. Good show, satisfied audience; and vice versa. With the projection of sound pictures this thought should be uppermost in the projectionist's mind. The audience is our first consideration. What follows, therefore, is predicated on this premise—the first thought for the audience, come what may.

The three main things in the projection of sound pictures are the fader (which must be impressed upon the projectionist's mind as the key to the whole situation in that it provides the only direct contact with the audience), the sound gate, and the sound lamp. The failure of any *one* of these elements to function means the failure of the entire equipment.

On Western Electric sound equipment, it takes approximately 5 seconds for the motor to attain full speed after the switch is thrown. A projectionist dare not bring up the fader before the motor has attained full speed, because the result will be analogous to starting a phonograph before its turntable has attained full speed, in that the sound, starting several pitches below normal, will gradually build up as the motor increases its speed and give a sound similar to an Oh-h-h-h-h. Such an occurrence will, of course, have a decidedly bad effect on the audience—an effect which will not be overcome throughout the entire show.

Primary Requisites

Before any sound picture is run the following three things should be in order: (1) the fader at zero; (2) the sound gate closed, and (3) the sound lamp lit.

Let us assume that a projectionist starts a show, gradually brings up the fader to a given point of, say, 9, but the equipment fails to produce sound. Looking down, he discovers that the sound lamp is not lit. Many projectionists immediately snap on the switch for the lamp, disregarding the fader entirely. The sound immediately will come on with terrific volume, with disastrous effect on the audience. The proper thing to do in this contingency is to snap the fader back to zero, switch on the lamp, and *then* bring the fader *gradually* up for the indicated volume.

Practically the same course of action is necessary in connection with the sound gate being open. Assuming that the fader is brought gradually up to the proper mark, the sound lamp is lit, but there is no sound issuing from the horns. The projectionist *then* discovers that the sound gate is not closed. Again, the natural tendency—and one that is often done—would be to snap the gate shut at once.

This action will produce *exactly* the same harmful results described in the foregoing illustration—a sudden bringing on of the sound with *terrific* volume. And again the process for avoiding any such occurrence depends on the same procedure with respect to the fader. Bring the fader back *at once* to zero, snap the sound gate shut, and *then* gradually bring the fader up.

Importance of the Fader

It will be clear from the foregoing that the fader is, in any emergency, *the key to the situation*—for by its proper handling all sorts of trouble may happen and yet the audience will not be aware of any trouble, in that they probably will take it for granted that that particular sequence has no sound accompaniment.

We have already noted the necessity for waiting for approximately 5 seconds before the motor attains full speed. Now, it is understandable that in these 5 seconds approximately 4½ feet of film, upon which there is both scene and sound, will have run through the projector before the fader is brought up. Does it follow, then, that these first few feet must be lost in the show? Not at all.

The corrective for this difficulty is to attach to the beginning of each reel at least 4½ feet of leader preceding the actual beginning of the film. This will effectively banish this difficulty and insure hitting, if we may use the expression, the first sound note "right on the nose." This practice has worked out marvelously well in the Roxy Theatre, New York, where the writer can recall having had to catch the last bit of sound on one frame—and having done it.

What would happen should there be a break in the film necessitating stopping the show? Most projectionists, through years of custom, would immediately reach to dowse the light and switch off the motor. Fine. But haven't we overlooked the fact that the motor consumes approximately 13 seconds to come to a complete stop? Meanwhile, what of the fader, which is the artery controlling the sound reproduction? Just this:

Practically the same bad effect heretofore mentioned, only with the process reversed, occurs. That is, the sound, starting at a high pitch, will gradually lose pitch and simmer down to a guttural groan. Therefore, remember—the fader first! *then* the light and the motor.

Speed Control

In a theatre which runs *only* sound pictures there it not, of course, any necessity for dickering with the speed regular. But what happens when the projectionist must run both silent and sound pictures? Let us assume that in an effort to gain a little time, a stretch of silent film has been run at, say, 92, or 94, or even 96. Then a sound film has to be run; but the projectionist forgets to set the speed regulator at 90, the standard speed for sound film.

The picture begins, the projectionist notices that the sound is too rapid, and discovers that he is running 2, or 4, or 6, or whatever the case may be, ahead of the desired speed. Should he immediately switch the dial back to "Regular?" Not at all; for by so doing he is inviting exactly the same sound distortion as outlined before—a gradually diminishing pitch of sound.

The proper method of handling this situation is to listen attentively to the sound and, when the end of a bar of music has been reached, to bring down the fader to zero, turn the switch to "Regular," and then bring up the fader again to the proper notch—all in one quick, sure operation, consuming only an infinitesimal amount of time. Of course, if the film is concerned in the main with speech, and the speed is,

(*Continued on page* 30)

Combination Speaker-Fixture

IT has been generally observed that the development of speaking units has not kept pace with advances in the design of the recording, transmitting and receiving apparatus of radio and talking pictures. Whatever there is of distortion of the original sound is usually attributable to the speaking unit.

Radio difficulties inherent in the fact that cone and drum type speakers tend to over-emphasize the lower notes of the scale and horn speakers the upper registers, missing or muffling the lower frequencies, have been aggravated in talking picture installations. In order to take advantage of the resonating qualities of the stage in theaters and auditoriums, the speaking unit has been placed on or immediately above the stage, which provides a satisfactory volume of sound—too much, perhaps, for those in the front rows—but the unit tends to put parts of the stage into mechanical vibration, producing unwanted sound frequencies. In addition, many motion picture theaters are so poorly designed from an acoustical standpoint that the sound is subjected to "dead spots," distortion, and other familiar acoustical ills.

These twin problems of radio and motion pictures are attacked from a new angle in a sound reproduction system designed by Christian A. Volf, Jr., electrical engineer and acoustician, who designed much of the bank and fire engine siren alarm systems now in use as well as several radio loud speakers.

The Volf reproducer, as the new device is known, is designed to be suspended from the ceiling in the center of an auditorium. so that all hearers are approximately equidistant and receive the sound in equal volume and clarity, irrespective of the acoustical properties of the building.

Organ Pipe Principle

From a sounding board and chamber employed in conjunction with an electro-dynamic speaking unit a silk screen is suspended. This is broader in its lower circumference. The waves set up create a downward current of air inside the screen and the sound is directed into 13 suspended organ pipes. Such pipes, as is well known, act as selectors, carrying and resonating only the sound frequencies for which they are fitted by diameter and length.

The purified and resonated tones, after passing through the pipes, are blended and amplified anew in a huge bowl filled with a fluid mixture and hung under the pipes. It is known that water carries sound very quickly, strongly and clearly.

Mr. Volf's system achieves a desirable insulation of metallic parts so metallic frequencies cannot be projected. Muffling and distortion are prevented by the construction, an end which is attainable to the extent achieved in this device only because a large space is available and because any reasonable expense need not be avoided.

The tones coming from the reproducer have no directional quality, yet tests have shown that there is a perfect illusion when the apparatus is employed in conjunction with talking pictures, that the sound is actually issuing from the screen. This illusion is partly optical and partly auditory. Some theaters have their organ pipes in the basement, yet the hearers believe that the sound is issuing from the dummy pipes which are placed in view to stimulate the imagination.

Combination Speaker-Fixture

The reproducer is housed completely from view by an unusual lighting fixture designed by Frank Houlihan of the firm of Cox, Nostrand & Gunnison, Inc., Brooklyn, which is cooperating with Mr. Volf in the manufacture of the unit.

Mr. Houlihan, who submitted the winning entry design in the recent competition of the Beaux Arts School of Design, has employed clear glass bars separated by decorative metal surfaces. The light is entirely indirect, being reflected by the metal surfaces and diffused through the bars. A system of control projects changing patterns through the glass tubes. Other fixtures are being designed to harmonize with prevailing styles in theater interior decorating.

The entire apparatus, including the lighting fixture, weighs 550 lbs. It stands 8 ft. high and about 5 ft. wide at the point of greatest diameter. The largest of the pipes is 5 in. in diameter.

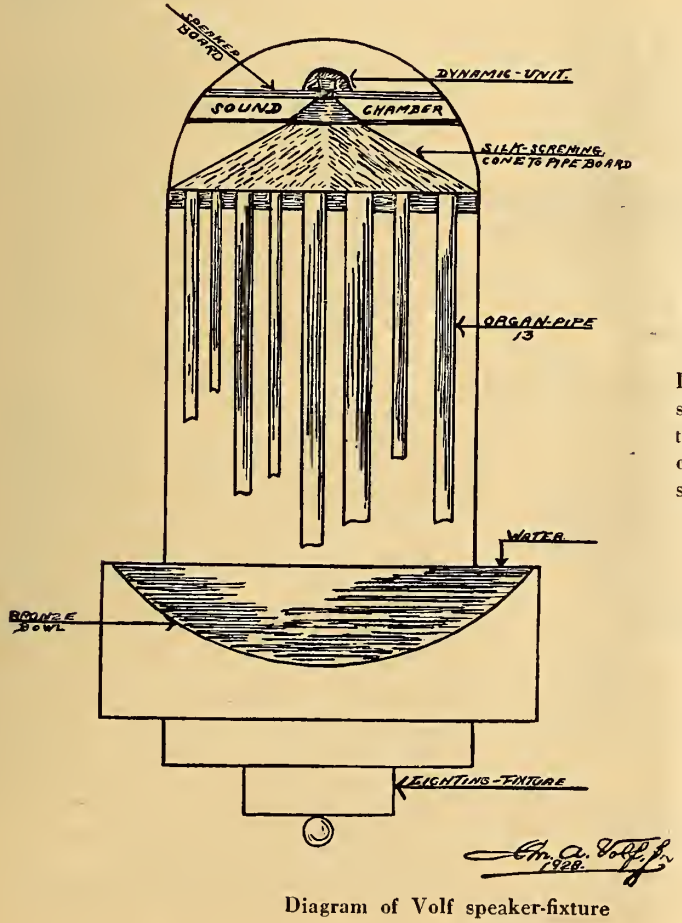


Diagram of Volf speaker-fixture

Diagram of Volf speaker fixture. Notice the organ-pipe construction, the sound chamber, and the water bowl.

210,000 Horsepower Generator

A new "largest in the world" claim is now made. The New York Edison Company has purchased the biggest single turbine generator ever manufactured. This machine's rated capacity to produce electricity is 210,000 horsepower. A few years ago the most powerful producer of electricity could manage by its best effort to put 5,000 horsepower on the line to light the lamps and run the motors of its city.

Columbia Joins W. E. Licensees

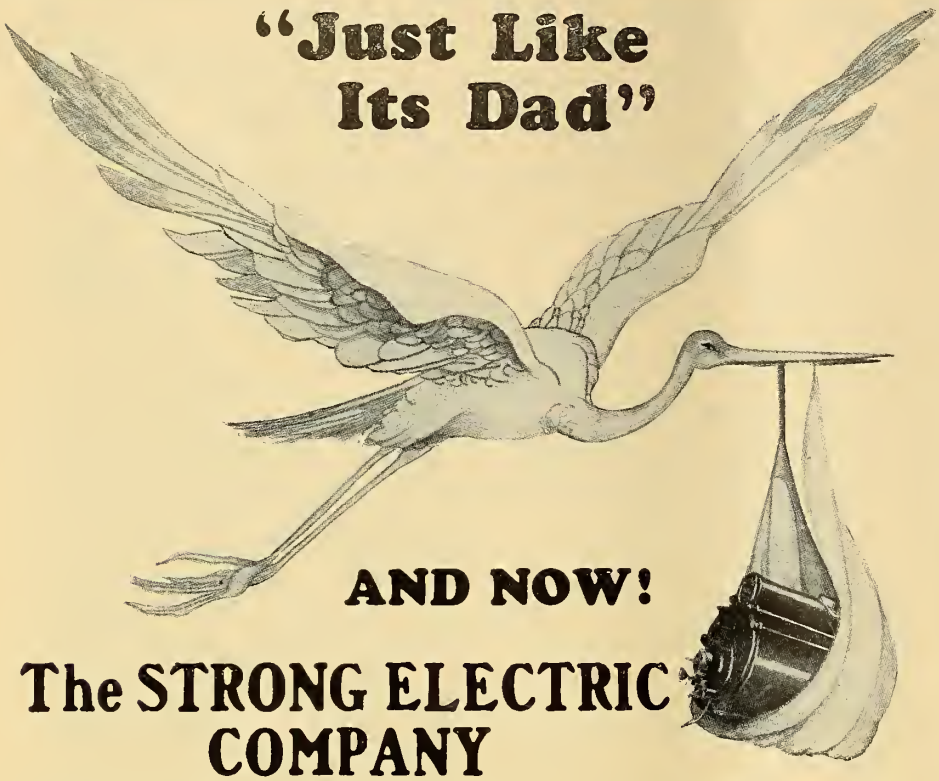
Columbia Pictures Corp. has joined the group of licensees who will produce and exhibit sound pictures under Western Electric patents. Columbia will go into sound picture production immediately, with about 10 of the company's 36 pictures for the coming year to be with sound.

Renewal Notice!

Renewal notices have been sent out to our October, 1927, subscribers. If you have received a pink renewal slip and a yellow self-addressed envelope, please send in your renewal at once, so that you will not miss any copies of this valuable publication.

Every issue filled with important information on how best to run Vitaphone and Movietone.

THE MOTION PICTURE PROJECTIONIST



The STRONG ELECTRIC COMPANY

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PRICE $10.50

BEST DEVICES CO.

Film Bldg. Cleveland, O.

New Dworsky Cleaner for Theatres

For a long time there has been on the market a motion picture film cleaner, made by the Dworsky Film Machine Corporation, now of Long Island City, designed to rid film of the dirt and gritty substances which attached themselves to the film.

The Dworsky Film Machine Corporation has hitherto manufactured a cleaner for use in the exchanges only. But now it has brought out a junior model for theatre work. It is small and compact and will fit unobtrusively into the smallest projection room. It is a power driven machine and almost self-operating. It requires no unusual supervision, as the mechanism is so simply devised that there is no chance of the film being caught, snapped off or otherwise damaged as it passes from reel to reel.

The film runs through a specially prepared film cleaning fluid which is also sold by the Dworsky Company, called Filmex. It is claimed that this fluid washes the film thoroughly without injuring the emulsion.

A reel of film can be cleaned by this process in five minutes. The Dworsky machine is beginning to be widely used in sound recording studios and exchanges handling sound film, and it is especially recommended for theatres playing sound pictures.

62½% Less Heat on the Film

(*Continued from page* 21)

resulting in an increase in illumination of the projected image of about 15%.

In view of the foregoing it is interesting to note that we are able to proportion the blades of the new type shutter so that we have a period of darkness representing that time during which no light reaches the screen of only 45 percent with the new shutter and a period of light of 55 percent in contrast with the old type of disc shutter, in which we have a period of darkness of 60 percent and a period of light of 40 percent.

Eliminating the Heat

The action of the new shutter in eliminating the heat from the film is due naturally to the interception of the light beam and, incidentally, the heat between the light source and the film. As the shutter makes one complete revolution during the cut-off action and another complete revolution during what might be termed the flicker interception, it will be readily seen that the entire action of the light beam and its incident heat is prevented from acting on the film while the film is in motion before the aperture and once while the film is at rest before the aperture. The heat of the light beam being allowed to reach the film only at two short intervals, once when the film comes to a stop before the aperture and again after the flicker interception and until the film starts in motion again.

Some interesting data was secured as a result of tests conducted in our factory, in

which a regular Model "H" Motiograph DeLuxe Projector equipped with a Motiograph Reflecting Arc Lamp as an illuminant was used, operated at twenty-five amperes. Temperatures were recorded with a pyrometer, the thermo-couple being positioned at the aperture center or film position. Tests were conducted in each case over a period of thirty minutes operation, the model "H" projector being operated at different speeds during each period of the test. It was found that an average temperature at the aperture of 564 degrees was obtained.

A previous test made with a Motiograph DeLuxe projector of the Model "F" type having the outside or shutter of the rotating disc type showed that the temperature at the aperture remained constant at 1486 degrees. Thus, with the new type shutter the temperature at the aperture is 922 degrees less or 62½ percent, representing just that amount of heat that is prevented from reaching the film.

Other New Features

Other important features of the new shutter tending both to improve projection and to further protect the film from heat action include the designing of the shutter so that its ends are constructed somewhat similar to the blades of a fan. These end blades accomplishing a circulation of forced air which functions to draw the radiated heat from the film gate, film tracks, tension springs and aperture.

Tests conducted at the factory show that as a result of this new shutter design the metal immediately surrounding the film gate and cooling plates showed a temperature which remained constant at 100 degrees in contrast with a temperature of 270 degrees where the old type shutter was used.

These improvements constitute an important contribution to the industry in perfecting a practical apparatus which will function to eliminate the heat from the film. In addition to the advantages it offers to film producing companies in safeguarding their product from the detrimental effects of heat which warps, buckles and shortens the useful life of film, this improved projector benefits the whole industry in that the film passing before the projector aperture in a true flat focal plane, distinctly better projection is assured with the fact that the objective lens is enabled to function to the full advantage of its high corrections and the inherent beauty of the photography is allowed to reach the screen.

There is also to be considered the beneficial effects of unwarped and unbuckled film in sound picture projection, since it is well understood that buckled and warped film tends to operate against perfect tone value in sound reproduction.

Theatrical Scales Rise

Of 46 wage increases granted to workers in September, the largest number of advances accrued to the theatrical trades, motion picture projectionists, stage hands, and musicians, according to "Facts for Workers," a monthly labor review. The second largest group enjoying wage increases was that of transportation workers.





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SPOT-FLOOD CONTROL

AN exceptionally powerful, long distance, spotlight, floodlight, and effect projector—of greatly improved design; complete—providing in a single unit everything required for white lighting, color lighting, framing, fading and spotlight attachments; having all controls centralized, and other accommodations to facilitate convenient, speedy and easy operation; 125 amperes; projects any distance up to 150 feet; gives anything required from a 4-ft. spot to a 50-ft. flood—and all colors desired.

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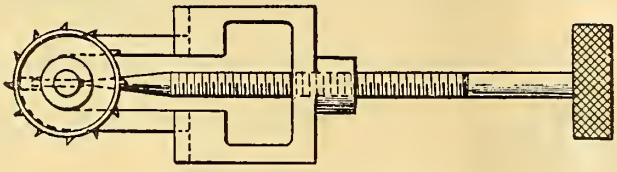
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Mfrs. of Portable, Manual, Remote Control Switchboards

Projection Literature

There have been so many inquiries at the office of THE MOTION PICTURE PROJECTIONIST for sources of literature on projection that the occasion is now taken to mention two popular works on the subject: James Cameron's bulky volume called Motion Picture Projection and F. H. Richardson's two-volume book called Handbook of Projection.

Both of these may be secured by writing direct to the publishers or by writing direct to this office.

These two books have already been widely sold and form the chief props in many a projectionist's private library on his work.

Sound Projection Problems

(*Continued from page* 23)

of the projectionist will, of course, play an important part in solving these problems.

Owing to the urgency of the situation there has been some tendency to sacrifice visual projection for sound projection but it is not our intention to permit this condition to continue any longer than is necessary. Eventually we will be able to give the public the quality of visual projection to which they have been accustomed and we shall devise ways to achieve this. In this paper we deal with only one difficulty that has arisen through the use of sound equipment and show how this problem has been solved.

New Film Registration

Improved methods of making changeovers have come about gradually and quietly but it is one of the things which has given us a higher quality of screen presentation. To eliminate defects which cause interruption of thought is to assist in maintaining the illusion which, of course, is the secret of the success of motion pictures.

In many theatres the changeover is made by manually stopping one projector and starting the other but the better theatres now use mechanical changeovers. The changeover is made on a fadeout or at the end of a scene and when properly done is imperceptible to the audience. When projecting sound pictures it has been found much better practice to make changeovers on titles in order to avoid repeating or omitting any of the action.

The title provides a more direct cue and the changeover is made from one projector to another on the same title. It requires about five seconds for motor of the projector to attain the proper speed and the title changeover permits the projectionist to change at the precise moment this should be done.

Title Change Difficulty

If the changeover is made before the projector has attained the proper speed (a standard speed of ninety feet per minute having been fixed for sound pictures) the speed of the sound producing element

Ilex Co. Announces New Projection Lens

THE Ilex Optical Co. of Rochester, N. Y., for a number of years makers of fine projection lenses for the amateur field, announce a new projection lens for theatres and general professional use. First announcement of this new lens to the industry appears in these pages.

This new Ilex lens is introduced as a strictly all-American product, and the selling campaign for it will include a determined effort to uproot the deep-lying prejudices of projectionists and theatre owners which in the past have militated against most American optical products, in the mistaken impression that such products, to be really good, must be imported.

Years of experience in the amateur field have enabled Ilex to gain a vast fund of information concerning the requirements for a really good projection lens, and the fruits of this experience, plus the application to design and construction of a mass of data growing out of a series of exhaustive tests of various projection lenses now in vogue in this country, have been applied to the manufacture of the new Ilex. The results of these tests may be had by any interested parties for the asking.

30-Day Free Trial

Among the features listed by Ilex as being characteristic of their new lenses are the following: (1) maximus contrast; (2) renders jet black and jet white projection; (3) absolutely free from disturbing grey-yellowish tint; (4) free from chromatic aberration; (5) free from coma; (6) free from distortion, and (7) general all-around perfection of projection.

In support of these claims, Ilex will employ a unique angle in their marketing campaign, in that they offer to send to any projectionist or theatre owner one of their lenses for a 30-day free trial, upon the completion of which the lens may be returned or retained, according to the results obtained under actual working conditions.

would be reduced with a resultant loss of tonal value. This effect is similar to that noticed through the failure to have a phonograph maintain the correct speed. Making changes on titles, however, has developed a defect which did not occur when the change was made on scenes.

Formerly all that was required to set the several projectors was to project the outlines of their respective apertures simultaneously on the screen and lock the projector in the position where the apertures' outlines registered. This method is no longer sufficiently accurate as the changeover is made from the end of one reel to the next on the same title. Unless there is correct registration there will be a noticeable jump as the changeover is made.

To secure proper accuracy in registration we have had made up a test film with vertical and horizontal lines marked on it, as shown by accompanying photo. The test film is threaded in frame in each projector with framing carriage in a central position. One projector is then started and moved vertically and laterally until the film image is properly located on the screen. The second projector is then similarly lined up using the first projector as a guide. The point at which the horizontal lines register is marked on the framing carriage, but it would be desirable to have the projector provided with a graduated scale as shown by the accompanying photograph, to provide a more accurate guide for resetting the framing lever at the proper point.

The test film used for lining up the projectors also prevents damage to the projection lens by absorbing the heat from the arc. Such damage frequently occurs when the direct light from the arc is allowed to strike the lens for an extended period.

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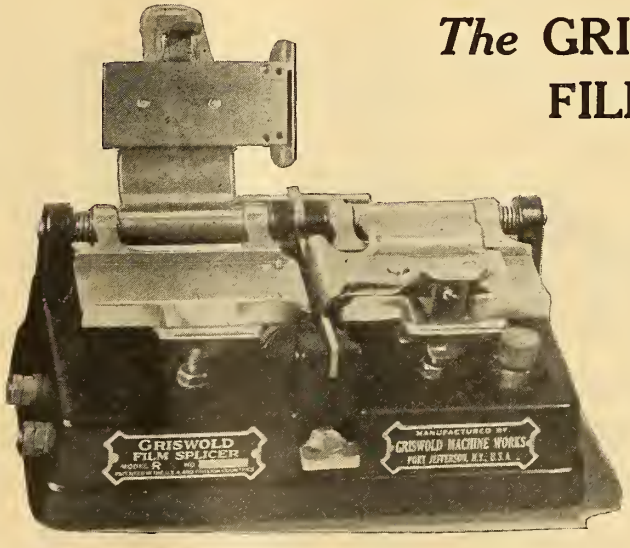
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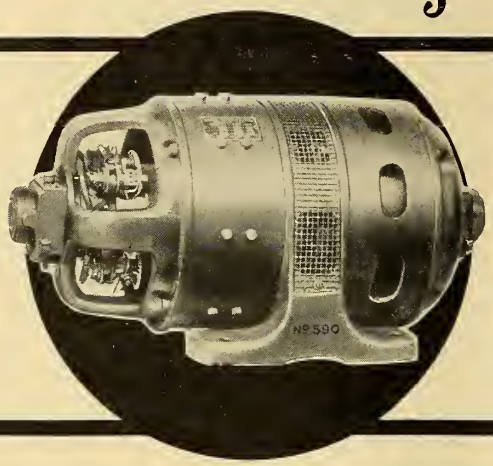
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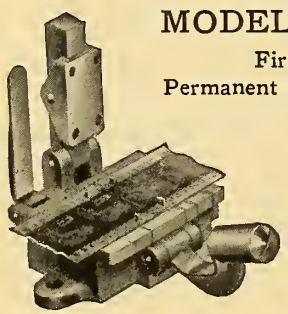
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For sale by all Supply Dealers

"Talkie" Troubles

(Continued from page 24)

say, 92, it would be best to let it run through as is. But anything over 92 demands immediate attention—the important thing to remember being that the operation *must* be done with discretion and, more important, speedily.

It is, of course, dangerous to trifle with the speed control box at any time during the actual running of a film. But if circumstances demand that sound film be run above the standard speed of 90, then, even before the film is threaded up, the switch should be turned to "Shunt," the motor started, regulated to the desired speed—92 or 94, as the case may be—and then stopped while the film is threaded. It is then ready for the film to start at exactly the speed desired.

Replacing Sound Lamp

Now, about the sound lamp. It is desirable—even necessary, in the interest of a perfect show—to have an extra sound lamp already fitted into its receptacle for *each* projector in use, whether the number of the latter be two, or three, or four. The advantages of this precaution are obvious.

Assuming that during the running of a show the sound lamp goes dead, it must be taken out, replaced by a new one which in turn must be properly set and focused, before the sound will be resumed—all of which takes time and causes a break in the sound reproduction. But with the practice of having a spare lamp already fitted into a receptacle which fits exactly each projector, the time required to replace lamps in an emergency is negligible. Each receptacle should be marked whether it is for Machine No. 1, No. 2, or No. 3, for a receptacle which may have been fitted for No. 1 may not be perfect for No. 2. This plan has proved its worth many times and should be adopted generally.

Every projection room having sound equipment has a monitor horn. Some projectionists have this horn turned on all the time, while others use it only as an aid for accurate changeovers. If one is accustomed to having this horn turned on at all times, he should form the habit of leaning out through the porthole at regular intervals to gauge the quality of the sound. Because the quality of sound conveyed through the monitor horn sounds okay to the projectionist is no indication that the quality of sound in the auditorium is satisfactory, the horn being a very poor indicator for this purpose.

The projection room usually being at the extreme rear of a theatre, a little checkup on the sound via the porthole every now and then is hereby recommended.

The hints given above, with the exception of the references to the sound gate and the sound lamp, apply both to Movietone and Vitaphone, or, as the case may be, to both film and disc methods of sound reproduction. Vitaphone changeovers often present many difficult problems to the inexperienced sound projectionist and require thorough rehearsing, at which time various steps necessary for perfect operation are brought clearly out.

A Trip Through Lens-land

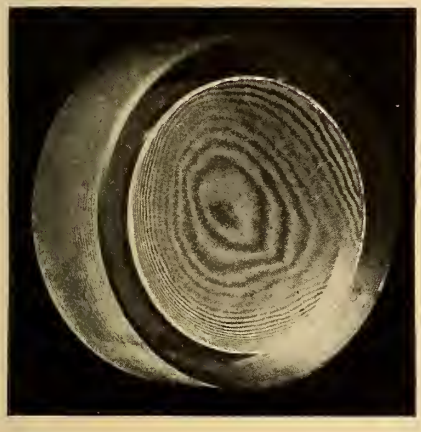
(*Continued from page 22*)

in spacing or in any other characteristic is at once detected and steps can be taken to remedy it. This also insures that *every* lens must be individually inspected without any possibility of a single one of them being slighted.

Cinephor lenses are all inspected with a reflecting arc lamp under the same conditions as in actual projection of motion picture film. In place of the film a small metal plate is used perforated with small holes so that about sixty openings appear in the area of a single motion picture film frame. When the image of this perforated plate is projected on to a white screen the sharpness of the edges of the circles indicates the definition over the entire area



Inspection room, showing the image of test film upon which lens is inspected for sharpness, definition and distortion.



Newton rings showing a nearly perfect surface. Notice the regularity of rings.

of the image, while their shape indicates whether or not there is any distortion present in any part of the lens. The experienced projectionist can detect in a moment whether the lens is up to standard for any of these conditions.

After the lenses have been inspected for quality with this arrangement, then a scale is added to the front of the screen which permits the size of the image to be measured very accurately. It is very much more accurate to use the highly magnified image as a measure of the focal length of the objective instead of actually measuring the focal length of the lens to a given focal point. It is here that our policy of using a separate formula for each quarter inch of the focal length is indicated.

A four-and-three-quarter inch focal length lens has been a four-and-three-quarter inch focal length lens since the designer first worked out the formula for the lens. A brief inspection of two or three of these lenses in a series, let us say, four and one-half inch, four and three-quarter inch and five inches, will at once establish the fact that the curves are entirely different on one or more elements of the lenses, the spacing is different and even the lens cells themselves are of different dimensions, so that if the three are set in a row there is no possibility of mistaking one for the other.

There may be, of course, some slight variation in focal length. To permit matched pairs of these lenses, every Cinephor is marked not only with its exact focal length but is marked plus or minus, as the case may be. Thus, if a 4¾-inch

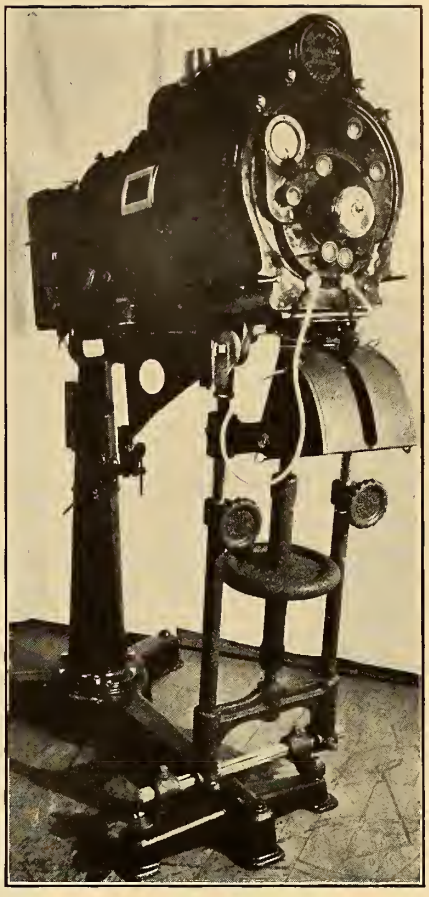


Showing the irregular rings produced by poorly matched surfaces.

focal length lens is desired, it will be marked 4¾ even, plus or minus. Cinephors, however, are held to tolerances of 1 per cent, over or under, of the focal length of the lens.

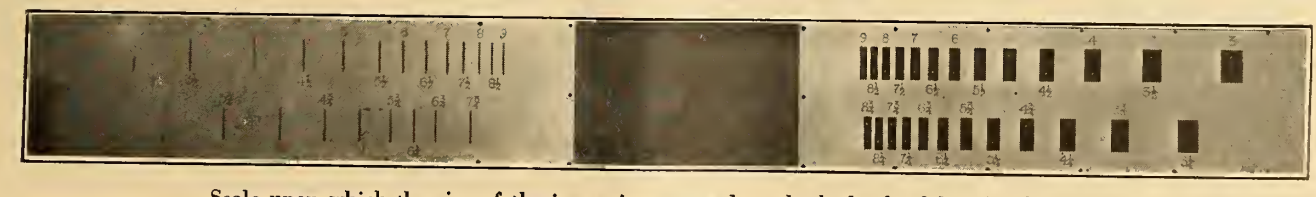
In matching a lens of the same focal length the marking plus or minus should be taken into consideration, and the pair will then be almost perfectly matched.

Definition is indicated by the extreme sharpness of the edges of the little openings over the entire area of the chart. Brightness of field is indicated in the same way, as any shading off at the edges or in the center of the field will indicate aberration of one sort or another which has the effect of impairing the definition. The matter of illumination is, of course, not so easily determined, but certain tests conducted over a period of time will disclose variations in definition and illumination between different makes of lenses.



MESTRUM'S combination lamphouse carriage and pedestal brace for Simplex projectors insures perfect rigidity and eliminates all vibration. Can be used with old-style, 3-point base or with new-style, 5-point base, especially with Movietone and Vitaphone. Installed quickly without machine work.

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Scale upon which the size of the image is measured to check the focal length of the lens

Where to Buy *Good* Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

These Dealers, by the fact of their being on this page, show that they value your friendship and your good-will. They appreciate your importance as a buying power. Instead of ignoring your existence or trying to reach you inexpensively by reaching your theatre manager, they are advertising direct to you. Let this show of good-will be mutual.

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Non-Flam Film

FRENCH film circles are considerably agitated over the French Government's decree that on and after January 1, 1930, all films shown in theatres in that country must be on non-inflammable stock. The decree originally set January 1 last as the deadline for flammable stock, but the plea of the French industry that it would be impossible to effect the necessary changes in time to conform to the law caused the Government to extend the time limit another two years.

Commenting on this particular legislation the August issue of the Official Bulletin of La Chambre Syndicale Francaise de la Cinematographie states:

"One of the questions that demand our immediate activity is that of nonflam film. To the last pronouncement of the Ministry extending the operation of the Decree to January 1, 1930, we replied that our industry would 'strive for the impossible' in order to be ready by that date. But, added to all the previously know difficulties is a new and very grave one.

Projectionist Asphyxiated

The accident which recently occurred at Ternes—which has so deeply affected us on humanitarian as well as professional grounds—caused us to learn with stupefaction that the *tragic death of the projectionist* was not occasioned by flammable film. He succumbed not only because of his burns but by *asphyxiation by gas generated from combustion of non-flam film.*

"Other instances of these poisonings have been brought to our notice; and we request that the industry should be acquainted with the full details of this new legislation which would subject the projectionist to such grave peril.

"Particularly should these investigations show the length of films, analysis of emanations, toxicity of the gases, medical certificates, etc., in order that we may enter into relations with the public authorities and give them the most frank and complete details."

English Sentiment Similar

Agreement with these statements is voiced by The Cinema, English trade paper, which suggests that before this legislation becomes effective the greatest care should be exercised in investigating the practical consequences of the decree.

The Cinema further points out that the legislation compelling the use of non-flam stock was first passed in France several years ago, but the enactment of the law has repeatedly been postponed not only because of the general unsuitability of non-flam to the needs of the industry, but also because of the dangers prevailing with its use.

In fact, it is strongly intimated that the latter consideration is of even more importance in staying the operation of the law than is the economic phase of the subject. The prevailing impression in both English and French film circles is that the government will finally repeal the law, unless, of course, someone perfects a better non-flam film.



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That Intermittent Again

From "The Bioscope," England

IT cannot be denied that the general standard of projection in this country (*England*), is remarkably high, but it is also a fact that the general American standard is somewhat better. The finest English projection is quite the equal of the best American, and the reason for the superiority of America's *general* standard may be found in the fact that the United States are enjoying a period of financial prosperity which enables the cinemas to pay wages and spend sums on equipment which the average British house would find impossible.

So much for the present situation; what of the projection of the future? The present technical tendency seems to be for the production of "gadgets" which will be of service rather to the enterprising showman than to the operator. The Magnatone and the Triptique (*sound devices*), are each devices of considerable interest, but it can hardly be claimed that they tend to improve the *quality* of projection.

Many Improvements Possible

That the black and white picture is capable of improvement will be generally admitted. The advent of stereoscopy and the elimination of flicker are both desirable. With regard to the first it cannot be said that any movements of note have come to light recently, but in connection with the second developments have been, and are now, rapidly maturing.

As long ago as April 12th this year, The Bioscope, under the heading of "Continuous Running Machines," stated that the advent of a projector having no intermittent movement would revolutionize projection. Instances of patents taken out in France and Budapest in connection with apparatus of this kind were given, but although both machines were probably efficient in operation, it seemed to us that their production might entail some considerable expense.

A description of another continuous running projector is now published in *The American Cinematographer*, (*for 16 mm.*) and for this machine it is claimed that only one portion of it, a ring mirror, requires a new machine for its manufacture. Every other part of the machine can be produced by firms employing operatives of only average ability.

Rapid Development Seen

Assuming this to be the case, the projector should not be excessively costly to produce, and we may, before long, see a new, and revolutionary, development in motion picture projection. But before it can hope to replace the present apparatus the "intermittentless" machine must prove its superiority in screen results and in wearing qualities. Several machines have been perfected which produce the soft dissolve of one picture into the next, but they depend on fine optical adjustments which give trouble in view of the great magnification on the screen. Others which do not depend on optical systems are impracticable because of the loss of light involved, but the problem should not be insuperable; it is, for instance, not nearly so difficult as the stereoscopic one.

The Discovery of A. C.

A young engineer met by chance, one day in Italy, an erratic Frenchman and a sporty young Englishman, who were displaying a crude device for distributing alternating currents of electricity. Being an employee of George Westinghouse, the manufacturer and inventor, the young engineer was much impressed. He cabled Westinghouse a description of the device and back came the reply by cable: "Purchase the American rights." This the engineer did and within a few months the alternating current system which has been responsible for the great electrical development of the present century, has been made a practical possibility by Westinghouse.

When Westinghouse began to experiment with alternating current, he was laughed at. People said it was dangerous and deadly and laws were urged against it. Many authorities of the time wrote that its use was unjustifiable.

Yet Westinghouse persisted. He realized that direct current alone would not make it possible to transport high voltages over long distances, and that the power development of the country was thus handicapped. With alternating current, however, the power of Niagara would be converted in electric current at the falls, and then sent across the country for many miles to turn wheels and lighten labor.

Today 95 per cent of the electrical energy used for power and lighting in the United States is alternating current. It is carried to consumers over 100,000 miles of high-tension lines. And to George Westinghouse, more than perhaps to any other, the credit for this great development is due.

Marvelous Precision Instrument

A precision instrument called a thermionic microammeter has been developed which is capable of measuring an electric current of a tenth of a thousandth of a millionth of an ampere with subdivisions of one five-hundredths of that amount. It is believed to be the most sensitive instrument for this purpose that has ever been built, and it will be used in making tests in incandescent lamps, currents in insulators, radio tubes, etc.

An idea of the extremely small amount of electric current which this machine will measure may be gained from the statement that an ordinary 40 watt electric lamp, consuming less than one-half cent's worth of electricity an hour, uses 200 billion times as much current as the amount represented by one subdivision on the scale of this instrument.

Projectionist Perfects New Speed Indicator

AMONG the projection room necessities ushered in through the adoption of sound pictures, none is more vitally essential than a film speed indicator. The effective synchronization of music or speech through the picture demands absolute film control on the part of the operator. It is obviously essential that such control can be attained only through the use of a dependable and accurate indicator for film speed.

It is significant that a projectionist, fully appreciating the need for such a device and the technical difficulties that must be overcome in its making, should design and perfect a film speed indicator at a price that pre-destines it to universal installation. Such is the case with the Strong Film Speed Indicator, recently perfected for distribution through the National Theatre Supply Company, by the Essannay Electric Manufacturing Co., well known as the makers of the Strong Change-Over Device.

Accurately Calibrated

The new Strong Film Speed Indicator is accurately calibrated to show both number of film feet per minute and the minutes consumed per thousand feet of film. The dial is lettered in clear numerals and is easily read at a glance from any angle—an important feature, definitely superior to most such devices formerly available.

The working mechanism of the indicator head is manufactured exclusively for the Essannay Electric Manufacturing Co. by one of the largest makers of speedometers and similar merchandise in the world. It can be readily adapted to installation on any model projector. The purchaser indicates the type of machine he is using and the Strong Film Speed Indicator comes to him ready for immediate installation on his particular model of projector. The cost is extremely moderate.

It is constructed for years of reliable use and its accuracy is guaranteed. The development of the new film speed indicator marks a definite contribution to the further perfection of sound pictures relying on synchronization with the projector. It is probable that this instrument will find an immediate place in the projection room of many theatres.

League Film Chamber

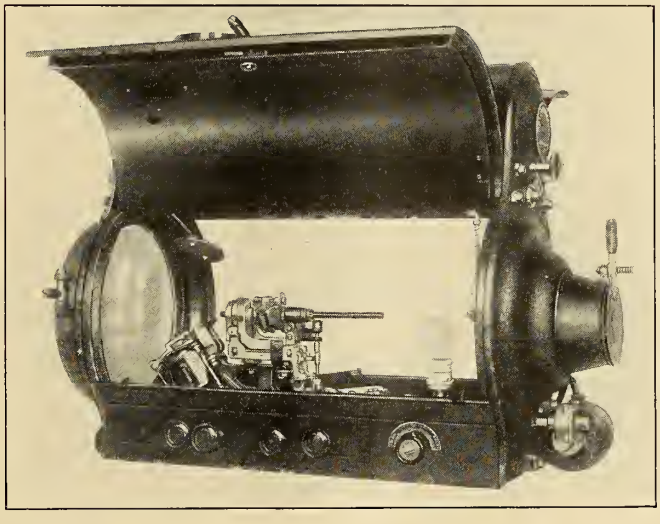
According to a German press report, the International Cinema Federation, instituted recently at the International Exhibitors' Congress in Berlin, will notify the League of Nations of its creation, and, at the same time, suggest that an International Chamber of the Motion Picture Industry be instituted at the League of Nations. The correspondent emphasizes the fact that the German management of the Federation is taking the initiative in endeavoring to create an official place for the motion picture industry, where it is most needed. Thus, no film problems would be discussed in the future without hearing the International Federation.

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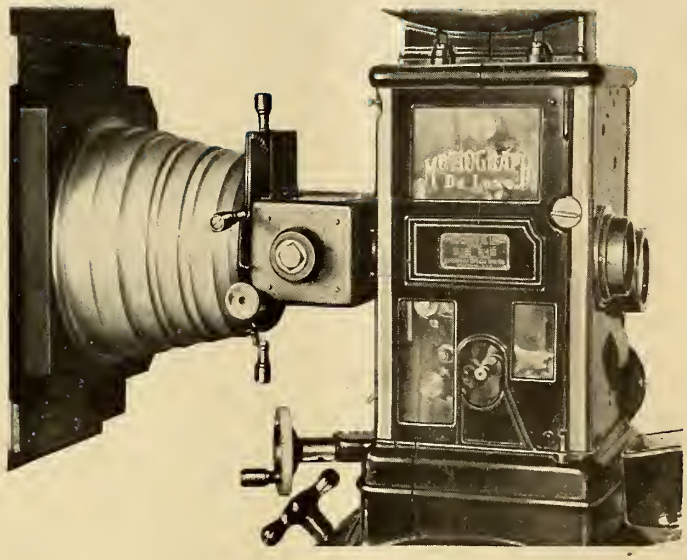


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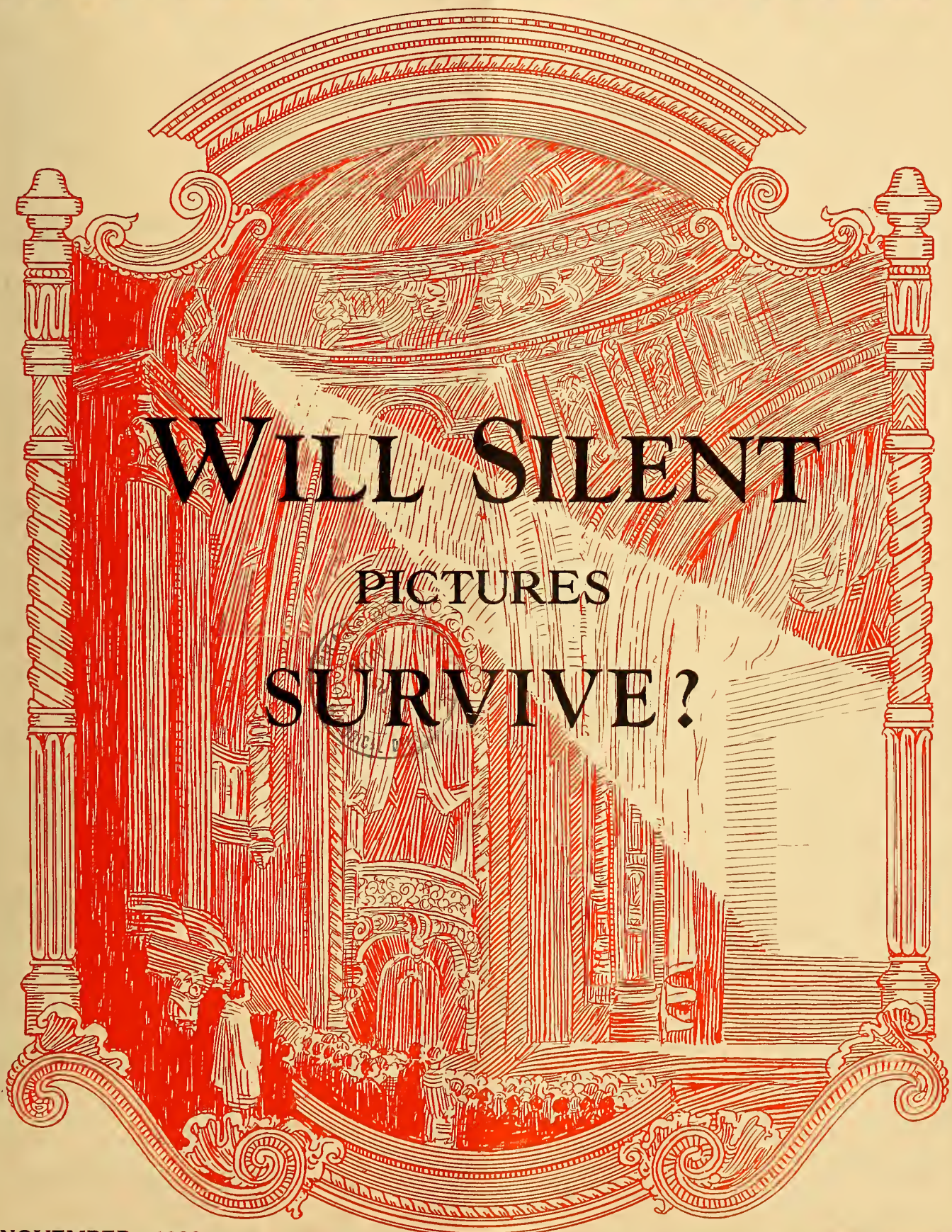
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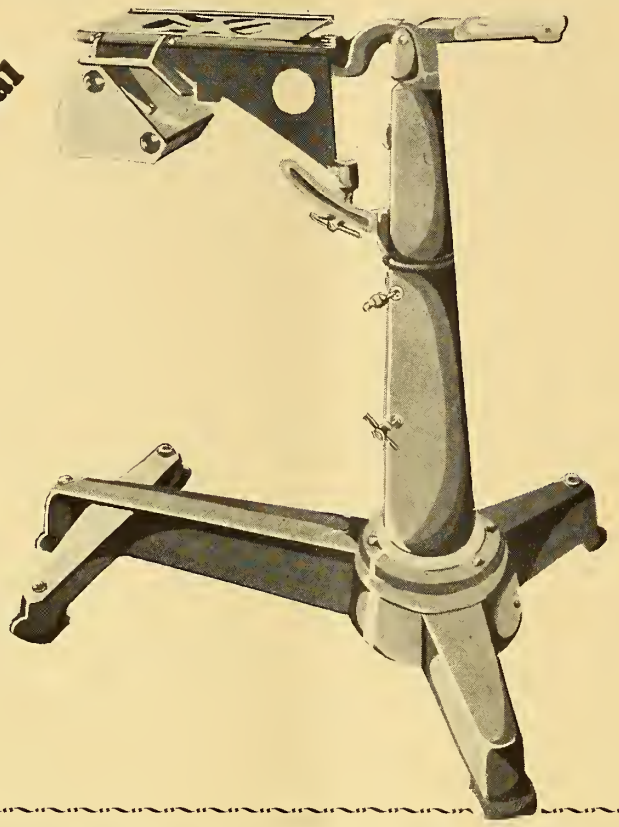


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THE MOTION PICTURE PROJECTIONIST

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Double Union Membership Aim of Federation

"ORGANIZE the Unorganized" was the keynote of the annual convention of the American Federation of Labor held this year at New Orleans. President William Green sounded this keynote following a meeting of the Executive Council prior to the opening of the convention. "Double Union Membership in 1929" is the slogan adopted by the Executive Council. The task of attempting to double the Federation's membership in a year calls for the greatest organizing effort ever made in its history.

6 Million Members Goal

It would mean, if successful, a membership of a little less than 6,000,000 at the end of next year. The present membership, as reported by Secretary Frank Morrison, is 2,896,063 paid-up members, an increase of 83,537 over last year. As unions did not pay per capita tax to the Federation on 500,000 striking or unemployed members, the grand total of membership actually is 3,396,063 members.

Proposals for intensive organizing will be concentrated, according to Mr. Green, on mass production industries wherever found, especially in the automotive field. The Federation will further such movements, he said, as those cooperative or group efforts recently undertaken in the Piedmont section of the Carolinas and in Reading, Pa.

The convention also considered the appointment of a Commission on Workers' Education—a review of the work in this direction during the past ten years and the laying out of a program for the future. The abuse of the power of injunction and the influx into the Southwest of a great many Mexican laborers were subjects of recommendations by the Executive Council.

Radio Turns on Street Lights

A radio wave that rides a 4,000-volt electric distribution wire now lights and puts out the street lamps of one of San Francisco's residence districts.

This new method, known as carrier current street light control, originated in Schenectady.

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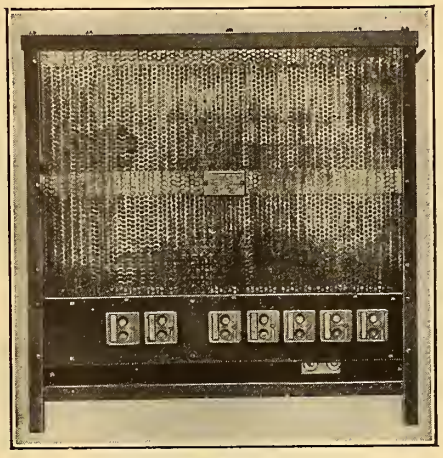
The use of electricity in the United States gains approximately 11 per cent each year. The total consumption during 1926 was approximately 74 billion kilowatt hours, and the present rate of use so far during 1928 indicates that the consumption this year will be in excess of 81 billion kilowatt hours, or practically 700 KWH for every man, woman and child in the country.

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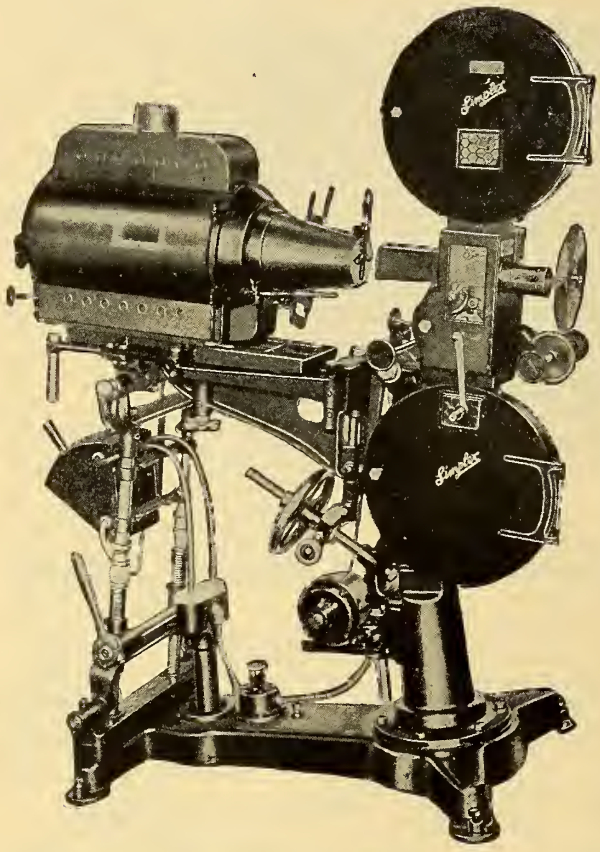
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Fundamentals of Speech, Hearing and Music

By JOHN C. STEINBERG
Research Department, Bell Laboratories

SOUND pictures unite two long lines of development: one of the recording and reproduction of sound, affecting the sense of hearing; the other of the recording and reproduction of visual objects, affecting the sense of sight. The success attained in these lines has been largely due to research continually carried on in the fundamental facts of each and to the perfection of apparatus modified with each advance in knowledge.

This paper briefly recounts some of the outstanding facts of the science of sound as it affects the development of the sound picture. It compasses in reality five subsciences: one pertaining to hearing, the sense organ on which all perception of sound depends; two covering speech and music, the types of sound most commonly reproduced; and two covering musical instruments and the voice.

Speech is produced by streams of air forced through the vocal passages by the lungs. The trachea or wind pipe is terminated at the upper end by the larnyx which contains two muscular ledges, known as the vocal cords, forming a straight slit through which the air passes. During speech these cords vibrate so that the slit is alternately opened and closed and by this action a train of sound waves is set up in the lower part of the throat.

As these waves pass out into the air, certain resonant and transient characteristics are impressed upon them by the vocal cavities and the movements of the tongue and lips, and it is these variations that are interpreted as speech.

Although the vocal cords lend quality to the voice they do not give, to any great degree, the distinguishing characteristics of the speech sounds. These are produced mainly by the mouth and nose cavities, as is evidenced by the fact that we can understand whispered speech, in which the vocal cords play no part.

The mechanism of hearing may be divided into three parts: the outer, the middle, and the inner ear. The outer ear, consisting of the external parts and the ear canal, terminating at the drum. The middle ear contains three small bones, the hammer, anvil, and stirrup, which connect the drum with the small window or diaphragm, "O" of the inner ear. The inner ear is a spiral cavity, "S," in the bone, which is filled with liquid.

Pitch and Loudness

Sound enters the ear as successions of minute changes in the air pressure, which are known as sound waves. These cause the ear drum to vibrate, and it is supposed that the liquid in the inner ear vibrates similarly, affecting the sense cells located in the inner ear—the high tones disturbing one end of the cavity "S", and the low tones disturbing the other end. This inner ear containing the sense cells, i.e., the endings of the sensory nerves leading to the brain, may be compared to the keyboard of a player piano in operation, the keys at different parts of the scale being disturbed successively with the progress of the music.

With the ear the pattern of the disturbance on the sense cells is carried to the brain and there interpreted as speech sounds.

The range of pressure and frequency that the ear can perceive is represented on Figure 2, where the scale on the horizontal lines represents the frequencies in cycles per second and the scale on the vertical lines the pressure of sound. Frequencies above 20,000 cycles are not perceived as sound, nor are those below 20. Any frequency between these limits, however, is recognized as sound if its pressure is above the lower boundary curve marked "Threshold of Audibility." The upper boundary, marked "Threshold of Feeling" indicates the pressure at which feeling begins. Above this line the sounds are felt, actually causing pain by their excessive pressure.

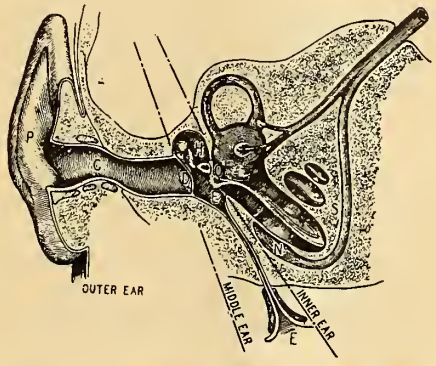


Fig. 1—A cross-section of the ear canal can only suggest its complex structure

Frequency and Pressure

Frequency and pressure are only the physical characteristics of a sound; our mental responses are called pitch and loudness. Both of these vary with their stimulus, difference in pitch between two sounds corresponding to the logarithm of the frequencies; and similarly, differences in loudness are proportional to the logarithm of the difference in pressure, but with loudness the proportionality is not quite constant, so that constant loudness lines are not truly horizontal. (Note: The logarithm of any number indicates how many times the root number "10" (ten) can be multiplied by itself to equal the number in question.)

Because of this logarithmic law the illustration is plotted with logarithmic scales, and in addition an arbitrary loudness scale is shown, Fig. 2, the units of which, called sensation units, correspond to the logarithm of the pressure.

Figure 2 shows clearly the disproportionality between pressure and corresponding loudness. If the pressure be arbitrarily taken as "10," its loudness in sensation units would be "20." Increasing the pressure to "1,000,"—that is, by 100 times—does not increase its loudness correspondingly but only 3 times. This physiological fact assumes great magnitude in actual sound work, and may also be applied to other sense organs than the ear, as for instance, the sensory reactions of the eye to light.

Male and Female Voices

Studies on the wave forms of speech sounds have shown that the pitch of man's voice is of an order of 128 cycles per second; that of woman's voice of an order of 256 cycles, and with both, overtones of the fundamental cord tone occur. These studies have shown further that frequencies as high as 8,000 or 9,000 cycles exist in various speech sounds.

In general, woman's speech is more difficult to interpret than man's, which may be due in part to the fact that woman's speech has only one-half as many tones as man's, so that the membrane of hearing is not disturbed in as many places. The greatest difficulties occur in the case of the more difficult consonant sounds which in woman's speech are not only fainter but requires a higher frequency range for interpretation.

Studies on the interpretation of speech sounds have indicated the presence of tones covering a large part of the audible frequency range. The location of the various parts of voice on the entire sound area is indicated in the illustration. Although in this figure the voice sounds have been grouped in sharply defined areas, actually the sounds overlap somewhat, and the indicated areas are those which are most important in the interpretation of the sounds.

The range from 3000 to 6000 cycles for man's voice corresponds roughly to the range from 5000 to 8000 cycles for woman's voice and since the ear is less sensitive at these higher frequencies and the sounds are initially fainter, their difficulty of interpretation is, of course, proportionately greater.

Characteristics of Musical Sounds

Musical sounds, like those of speech, consist of a fundamental frequency and various overtones, but unlike speech are sustained for appreciable lengths of time,

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and changes in them usually take place in definite steps, known as musical intervals. The frequencies that are present depend upon the type of instrument and the character of the music, but the pitch of the tone is determined by the fundamental frequency which, however, need not be present in the musical tone, as the overtones, which are multiples of the fundamental, may cause the correct pitch sensation.

Musical instruments may be divided into two general classes, string instruments and wind instruments. Tones of string instruments, produced by plucking, striking, or bowing, are usually reenforced by resonating air cavities and sounding boards. Tones of wind instruments may be produced by the aid of reeds as with the clarinet or with the flute, or by the lips of the player acting as reeds, as with the horns. Each class may be further subdivided into melody and harmony instruments. In the former class only one note is usually produced at a time; in the latter class several notes are usually produced simultaneously.

In general, harmony instruments are capable of producing notes over a much wider frequency range than melody instruments and a given type of instrument of the latter class may, therefore, include several instruments each covering different frequency ranges, such as the bass, tenor, and alto trombone.

Experiments have indicated that notes of different frequency or pitch as produced by a musical instrument appear about equally loud to the ear, which might be expected as the ear has played an important part in their design.

Musical Range Pressures

In Figure 2, contour lines of equal loudness are shown for the frequency range from 32 to 4,000 cycles, which has been divided into three parts, the bass, tenor or alto, and soprano registers, corresponding to the notes produced by various instruments. The contour lines indicate that the notes of the lower registers have greater sound pressures than those of the higher. The range of pressures for various instruments, however, is smaller for low notes, as has been determined by direct measurements of the pressures produced when played by musicians. Contour lines for loud tones show a smaller change in pressure in going from low to high notes than do the contour lines for faint tones, so that it would seem that music played faintly would cover a greater pressure range than loud music.

Percussion instruments such as drums and the various accessory traps produce the greatest pressures that are used in music and although the fundamental frequency of the notes which they emit is fairly low, the complete notes are particularly rich in tones of higher frequency, extending as high as 10,000 cycles. Although these higher tones die out rather rapidly, they are essential to good definition.

The organ, the piano, and the harp have the greatest span, covering a frequency range from about 16 to 4,000 cycles. All three of these instruments are characterized by a rather prominent first overtone, so that their effective range extends as high as 8,000 cycles.

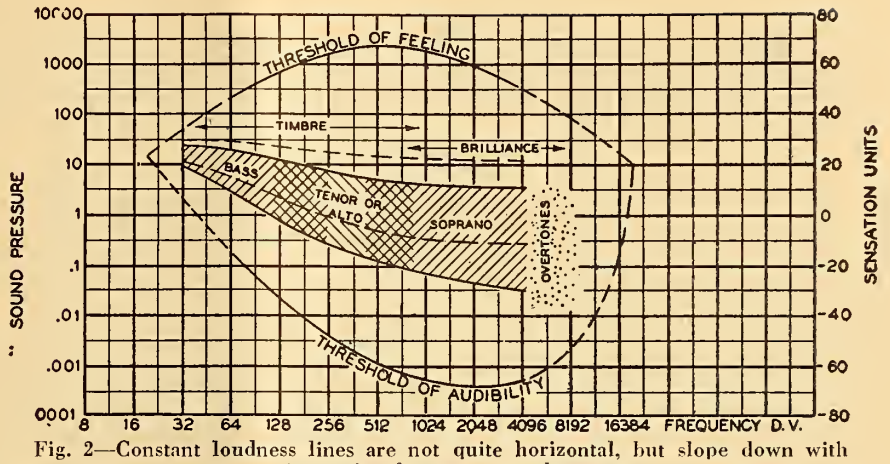


Fig. 2—Constant loudness lines are not quite horizontal, but slope down with increasing frequency, as shown

Melody instruments, owing to their limited range, are among the easiest to reproduce. In any given register, wind instruments produce greater intensities than string instruments, of which the violin produces the faintest sounds. As a class these instruments produce notes covering the frequency range of 32 to 4,000 cycles.

From the auditory sensation area, we have seen that the ear is able to perceive a large number of tones of different intensity and frequency. We have also seen that the voice and various musical instruments produce tones which cover a large portion of the auditory sensation area. In order to obtain information as to the relative importance of various parts of this area to the sensory characteristics of speech and music, experiments have been performed in which the tones falling in various parts have been eliminated from the sounds by means of filters.

Speech Character Changes

When frequencies below 100, 200, 300, or on up to 1,000 cycles are progressively eliminated from speech, its character changes markedly, the terms "timbre" or "tone color" best describing the characteristic lost. This characteristic appears to be associated with the fundamental and the first few overtones of the voiced sounds and their presence is necessary, therefore, in order to convey this quality, but for the correct interpretation of the speech sounds frequencies below 300 cycles do not appear to be essential.

When frequencies above 8,000, 7,000, or on down to 3,000 cycles are eliminated, the character of the speech again changes markedly; the term "sibilance," appearing to describe best the characteristic lost, refers to the prominence of the hissing or frictional character of speech. If attention is directed to such sounds as s, f, th, and z, the elimination of frequencies above 6,000 or 7,000 cycles is readily detectable, but it requires rather close attention to detect the elimination of frequencies above 8,000 cycles.

Elimination of frequencies above 7,000 cycles, however, slightly impairs the interpretation of the s and z sounds of woman's voice and elimination of frequencies above 6,000 cycles those of the f and th sounds of man's voice, and of the f, th. s, and z sounds of woman's voice. The impairment due to eliminating higher frequencies is usually greater in the case of female voices.

As with speech, the tone color or timbre of musical tones also appears to be associated with the fundamental and the first few overtones of the note produced. Timbre is probably more important in music than in speech, as it is one of the things that distinguishes the tones of various instruments.

In general, the fundamental and the first three overtones are necessary in order to distinguish the tones of various instruments. When overtones higher than these are eliminated the tones lose a characteristic best described by the term "brilliance' or "definition"; they seem to lose life and become dull. The prominence of these characteristics varies with the type of instrument, the composition of the music and the personality of the musician.

The notes which are used most in music are contained in the octaves between and above middle C, or from 128 to 512 cycles, and as the fourth overtone of 512 cycles has a vibration frequency of 8,192 cycles, tones of this frequency and below occur frequently in music. A trained ear could no doubt detect the elimination of frequencies above this range from the ordinary run of music, but the average individual would have difficulty in detecting the elimination of frequencies above even 6,000 or 7,000 cycles, unless he gave particularly close attention to the percussion instruments.

Another phenomenon of hearing which enters into the sensation of sound is called masking. Lower pitched tones in a sound deafen the auditor to the higher tones, and this deafening or masking effect becomes very marked when the sound pressures of the lower tones are greater than twenty sensation units. The optimum loudness for the interpretation of speech corresponds to a sound presure between 0 and 20 sensation units. If the sound pressure is less than this, the fainter sounds are inaudible, while if it is greater, the masking effect impairs the interpretation. When sounds are increased in loudness, the lower registers are accentuated because of this masking effect so that for most faithful reproduction sounds should be reproduced with about the same loudness as the original sounds.

Some Novel Projected Picture Presentations*

By LEWIS W. TOWNSEND
Projection Engineer, Eastman Theatre and School of Music, University of Rochester.

AND WM. W. HENNESSY
Projection Dept., Eastman Theatre, Rochester, N. Y.

MANY of us remember Lyman H. Howe who toured this country for several years with his famous travel pictures. He began before the birth of the Nickelodeon and continued to be a success for a number of years after our present movie palaces were established. Let us analyze his methods. Most of his subjects were photographed with short focal length lenses. He then brought his audience right into the scene by making his projected picture nearly large enough to fill the average stage opening. It appears that this, together with especially good projection for that time, was the greatest factor of his continued success. The above is cited merely to show that motion pictures of greatly enlarged dimensions are really nothing new.

Many novel presentations have been secured by using applications of this idea. These may be of interest to the producer or theatre manager or may suggest other ideas that will eventually be of more real value than those which are described below.

The normal size of our screen (Eastman Theatre, Rochester) is 17 by 21 feet, using an objective lens of 6¾ inches E. F. at a distance of 160 feet. In the week beginning Feb. 15, 1925, we played the feature entitled *North of 36*. The stampede scenes in this picture were enlarged to 30 by 40 feet. For this purpose a large white screen which filled the entire stage opening was dropped in front of the regular screen.

Idea Not New

During the week of May 29, 1925, *The Thundering Herd* was shown, and in this case the great buffalo round-up scenes were projected in the same manner. In each of the above cases one projector was equipped with a standard 3½ inch E. F. objective lens and a 5 to 1 intermittent movement, thereby permitting a shutter blade of less width to be used. By using 150 amps. instead of 120 amps., as on the regular lamps, the screen illumination compared favorably with the balance of the projection on the regular screen.

In the week of October 11, 1925, another application of this idea was to blend the prologue of *The Iron Horse* smoothly into the start of the picture. The prologue, entitled *The Vagabonds,* ended with typical hoboes boarding a set train which was pulled off stage at the close of the act. As the train was pulled off, a picture of a locomotive coming head-on and passing over the camera was projected on a gauze drop which had been used at the front of the stage during the act. This picture was also 30 by 40 feet.

While the locomotive scene was being run, together with train effects from stage and orchestra, the regular screen was lowered just back of the gauze and, just at the moment when the engine seemed to leap out over the audience, the title of *The Iron Horse* was started, using the regular picture size. The gauze drop was raised during the title and the feature was shown in the regular manner.

On Aug. 29, 1926, *The Black Pirate* was our feature. This picture was singularly lacking in the usual profusion of close-ups. Scene after scene consisted of medium or fairly long shots. Because of this it was decided that it would get over better if projected slightly larger than our standard screen. After a few experiments we decided on a screen size of 21 by 28 for the entire feature. This worked out very satisfactorily.

A point to be noted here is that the idea of enlarging certain scenes of a picture to enormous dimensions was used at the Eastman Theatre, Rochester, N. Y., on Feb. 15, 1925, and again in May and October of the same year, and in August, 1926. In December, 1926, the same idea was used in presenting *Old Ironsides* at the Rivoli Theatre in New York. It was at this later date that Mr. Zukor (president of Famous-Players Lasky Corp.) hailed it as being the "greatest advance in projection in twenty years."

Many Other Applications

Many other applications of the original idea have been evolved from time to time as follows:

1. *To heighten spectacular or dramatic effects in a picture:*

Take, for instance, the ballet scene shown as a fade-in as Colleen Moore looked into a teacup in *Twinkletoes*. In this case the large sheet was masked by black velvet in such a manner that a 17 by 21 foot opening was used for all but the ballet scene. As this scene was faded on, the mask was pulled up at the top and out at each side until it disclosed a 30 by 40 foot screen. The entire ballet scene was used at this size. As this scene faded out the mask was brought back to the standard 17 by 21 foot size, all during the continuous projection of the picture. The elephant stampede scenes in *Chang* were also enlarged in the above manner. In this case it was again necessary to go from the small screen to the large one and then back to the small one for the balance of the picture.

2. *To create atmosphere or feeling for a picture previous to the appearance of the feature on the screen:*

Our presentation of *The Fire Brigade* was a good example of this. Three hundred feet of specially made film showing flames continually rising were projected on a white velvet curtain over the entire stage opening. Our regular screen is surrounded by medium gray drapes instead of the more common black mask. The flame scenes were started on the front white velvet curtains previous to starting the feature. The flame film con-

(*Continued on page 28*)

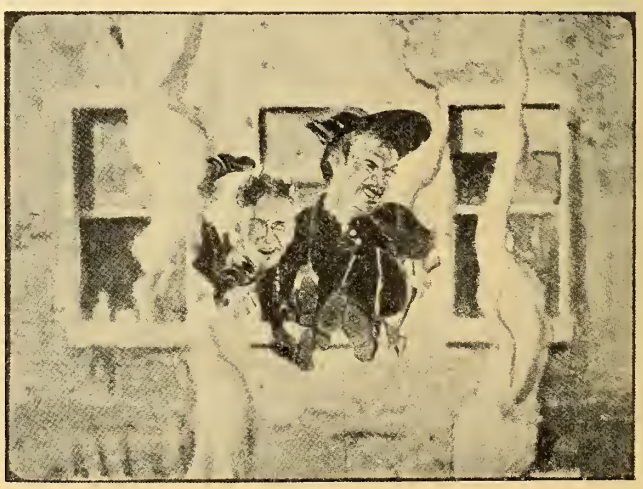


Fig. 1—Introductory Picture for "Fireman, Save My Child"

* S. M. P. E. Transactions, Vol. XII, No. 34.

What About Color Photography?

By HANS VON FRAUNHOFER

DESPITE endless study and expensive experimentation by practically all the raw film, photographic plate, and paper manufacturers, as well as by scientists in all parts of the world, the art of color photography and color cinematography is still in a primitive state. On both sides of the Atlantic, experts openly admit that the problem of natural color photography and natural color cinematography is still an unsolved one. Although the Patent Offices of almost every civilized country have on file hundreds of patents on processes for color photography, and although many millions of dollars have been spent in the development of this art, a color photograph is obtained only at great cost and with the aid of many complicated and laborious methods. In motion pictures, too, color scenes are the result of costly and complicated mechanical and optical processes.

It is interesting to know that the problem of color photography can be solved in only three ways, namely, the "additive" method (optical); the "subtractive" method (mechanical); and the "auto-chrom" method (chemical).

Most scientists and inventors, during the last quarter century, have followed the optical and mechanical methods, and have, therefore, failed in producing a method of color photography and color cinematography which would justify universal adoption.

Additive Method's Defects

Past performances have proven the fact that the "additive" method, although theoretically sound, is not commercially feasible for several reasons. The first and most important reason is the fact that all optical methods have to use contrast filters to obtain color separation. These contrast filters absorb so much light that it is very difficult to obtain proper exposures. Because of this, it is only possible to obtain good negatives on a very bright and sunny day, and even then, only between the hours of 10:00 A.M. and 3:00 P.M. In the projection of an "additive" film, we encounter the same difficulty, namely, the loss of light due to the use of contrast filters. It is admitted that this difficulty can be eliminated, but even if this were done, the "additive" method has two other serious draw-backs that could not be done away with. These are "flicker" and "color-fringes," the latter named by Professor Miethe "parallaxa."

The "flicker" is due to the fact that the additive method is a method which uses two frames if it is a two-color process—red and green alternating—or if it is a three-color process, red, green and blue alternating. It is a well-known fact that red is a warm color, whereas green and blue are half-tones and cold colors. In the projection we encounter, therefore, the difficulty of mixing the two or the three colors so as to obtain a "flickerless" picture.

Scientists who have devoted a great deal of study to the development of color disks and filters frankly admit that it is impossible to devise a disk or scenes which enable a flickerless projection. If the colors used in the screen are too light, the result is a colorless picture on the screen; and if the colors are too vivid, the "flicker" cannot be eliminated. Theoretically, a two-color film should be "flickerless" at a projecting speed of thirty-six pictures per second. But this is only a theory. The fact is that, at a projection of even forty pictures per second, a steady and "flickerless" picture is not brought about. It simply cannot be done with less than forty, and the moment the picture is to be projected at forty pictures a second, the process has ceased to be feasible for either amateur or commercial purposes.

"Color-Fringe" Unsolved

In addition to the unavoidable "flicker," there is the element of "color-fringes." The elimination of this is impossible, and for this reason if a moving object, such as a ball, travels in the air, in the first of the alternating frames the ball will be in one position. In the following frame, this position is changed. The result, therefore, is an imperfect registry, and an imperfect registry will always produce a "color-fringe." This "color-fringe" cannot be eliminated. It may be reduced somewhat through a greatly increased speed in taking the negative, but when such a negative is then projected, it has the appearance of "slow-motion" pictures and the effect is rather comical.

Books could be written on the subject of "additive" photography, and the various methods that have been developed by such capable scientists and inventors as Urban & Smith, Gaumont, Friese-Greene, Horst, Busch, Pillny, Szepanik, Keller-Dorian, etc. However, as far as the "additive" (that is, the optical method), is concerned, it may be discarded as commercially impractical, and this in spite of the fact that, so far, the best colors have been produced by it.



Projector

In view of the fact that the scientists realize the insurmountable shortcomings of the "additive" method, they have devoted a great deal of time and much effort to the development of the "subtractive" (mechanical method). A good many methods have been developed, such as the Technicolor, Brewster, Prizma, Kelly, Colorchrom, Multicolor, and a good many others. The "subtractive," or mechanical method, is purely a two-color process, with a great many limitations. Its manufacture is very complicated and is possible only through the use of highly complicated and expensive machinery, and because of this, the method is limited to use by only very well equipped and highly scientific laboratories.

Negative Production Difficult

In the production of the negative film, it is necessary to use a negative material that is twice as wide as the normal black and white film or twice as long. It is also necessary to use a special camera for the production of the negatives. This camera must be equipped with prisms or mirrors which separate the rays to obtain color separation. In the use of this type of camera, the same difficulties are encountered as in the optical method through the use of contrast filters, which causes a tremendous loss of light, and because of this only very highly skilled photographers succeed in obtaining a negative that can be used.

The development of the negative that is so obtained is rather difficult. To go into the highly scientific details of the subtractive methods is impossible through lack of space. However, if I point out the biggest difficulties of the "subtractive" or mechanical method, I have accomplished all that, I believe, my readers could desire. This is the difficulty: To obtain a print from such a negative is the most difficult part of the "subtractive" process, and therefore, the positive must either be double-coated (a coat of emulsion on each side of the celluloid), or the printing must be done twice by superimposing. And it is here that the great difficulty lies, which produces an endless chain of trouble for the printer.

Sprocket Hole Problem

It is common knowledge that it is impossible to get absolutely evenly divided and distributed sprocket holes on the celluloid. No machine has been devised that could accomplish this with mathematical precision. And, as long as we cannot get perfected perforations, we cannot get perfect registry in print, so that the two superimposed pictures register in the proper manner as to avoid color-fringes. The "subtractive" or mechanical method, due to its very nature, produces bright and clear pictures only in "close-ups," or of objects that were photographed from a few feet distance from the lens. The moment a distant object, at, let us say, fifteen or twenty feet away, is taken, the

(*Continued on page* 25)

As The EDITOR Sees It

¶ *Sound vs. Silent Film*

RECEIPT recently of communications from Local Union Secretaries commenting on what appeared to them to be the overemphasis placed on sound pictures in the industry caused us to review the development of this form of entertainment within the past year, while keeping a weather eye peeled for the future. Our correspondents ventured the opinion that sound pictures were alright in their place—providing the latitude allowed them was not extended over too great an area. We take this to mean that our correspondents infer that sound is suitable as an embellishment of a newsreel but that its effective use with features has already been disproved.

To this opinion we do not subscribe. It is admitted that sound pictures have their limitations and that very many features of present sound devices will have to be enormously improved or supplanted by altogether new equipment before motion pictures with sound accompaniment will have been proved successful and wholly desirable from an entertainment point of view. Even now rumblings of discontent are heard from certain quarters where sound pictures are regarded as the futile efforts of the motion picture business to revive interest in a form of entertainment which was losing its grip upon public favor. But these limitations are gradually being overcome or greatly reduced.

¶ *A Challenge to Discretion*

OUR opinion is that silent pictures will never give way *entirely* to sound pictures. So much depends on the exercise of good judgment on the part of those in whose hands lies the development of this new process that any peering into the future must necessarily stop when this consideration is reached. Who knows but that in the not too distant future silent pictures will be as much a novelty as were sound pictures just a few months ago? Pictures of a theatre advertising the merits of its "restfully quiet" surroundings as an inducement for the brain-fagged and the weary flash into mind quite readily.

It would seem that the proper attitude on the situation is that of simply considering sound pictures as a natural and inevitable step forward in the development of the motion picture—a broadening of its field and an extension of its useful functions. Who knows but that in a short span of time yet another new force, astonishing in its possibilities, will flash into the industry with the same breath-taking suddenness which marked the arrival of sound pictures? Television, that mysterious science which lurks ever on the fringe of the industry, is yet in the offing. We are told that the full development of this science will require many years, yet, in view of the familiar sound of that statement, one may not be assured on this point.

¶ *Inadequate "Talkie" Test*

HAD sound pictures been heralded far in advance of their arrival, much of the present uncertainty on the subject would be conspicuous by its absence. It seemed as though the coming of sound was promised one day and on the next day was a fact. Naturally there was much confusion, and the industry has not yet returned to an even keel. It has been repeated over and over again that sound pictures are here to stay. Hardly anyone doubts that statement today. Of course sound pictures are a permanent fixture in the picture field . . . . but what of the silent film? Will all future programs be given over more and more to sound, with the silent picture being gradually eased out altogether? Or will the "talkies" run their course and then, having proved themselves only a boresome novelty and an impediment to really good silent pictures, be in turn supplanted by their inarticulate brother?

Public favor will provide the answer to all of these questions. Just now the "talkies" are proving themselves a boon to the picture business. This early reaction may in time be demonstrated as only the temporary interest evoked by any novelty, and then again it may not. The aforementioned rumblings of discontent with sound pictures as is are readily ascribed by the optimists in the industry to an "arty" group who profess to be shocked at the alleged usurpation by the "talkies" of the natural functioning of one's imagination.

¶ *Some Defects Apparent*

BUT one thing is certain: There are apparent serious defects in both the production and the reproduction of sound pictures. Production difficulties are fairly well-known and need no recounting here; while projectionists are familiar with certain aspects of the reproducing processes which tend to impair the quality of the picture. On the projection end, the matter of better speakers, better screens and simplified equipment are problems awaiting solution. The matter of the screen is particularly important, but hope of early improvement lies in reports of experiments now under way to overcome this difficulty.

When these problems have been solved, then only may the "talkie" be compared on an equal basis with the silent film. Just now the tendency is to qualify the endorsement of sound pictures with the statement that as a result of the improved technique in production and reproduction processes, the very near future will witness a product of comparatively far superior quality. If this view proves to have been justified, then the silent picture will necessarily have to be shelved. Silent films undoubtedly will always be in demand in small quantities, but aparently sound pictures will succeed in displacing them.

The importance of the role to be played by silent films in the future may not be forecast with accuracy at present, but the straightening out of the minor tangles enumerated above will go far to hastening the decision. As between a good sound picture and a good silent film, it is inevitable that the former would be favored, with the silent film always having to be much better than merely good to surpass it. And this final summation presents in a nutshell the relative superiority of one over the other.

The Magnascope*

"Largest Screen in the World"

By HARRY RUBIN

Supervisor of Projection
Publix Theatres Corp.

THE term "Magnascope" was created by our organization for popular publicity purposes, and as it is reasonably exact and fairly descriptive has been retained. Size is not, however, the sole consideration and the word "Magnascope" is in a sense a misnomer. The contrast between the small and large picture is impressive, but a very effective illusion of growth is also secured by the gradual withdrawal of the maskings. It is quite possible that the large picture more closely approximates the natural range of vision and is therefore easier on the eye.

It should be clearly understood that no claim is made that any new engineering principle is involved or that any radical mechanical advance has been made in the development of the Magnascope. It was, however, a striking and quite ingenious novelty, proved highly successful for entertainment purposes, and it attracted more attention than anything of a similar nature for many years. It clearly indicates the value of such novelties and calls attention to the importance of projection presentation.

Presentation Is Inexpensive

By "projection presentation" is meant novelties for entertainment purposes, ordinarily originated by the projection department, controlled by the projectionist, secured through certain changes in the projector, by adapting the screen to special purposes and the utilization of special film intended to be used in conjunction with the mechanical changes that have been made.

In the development of projection presentation, a thorough knowledge of projection and stage craft is, of course, essential, and this is all that was required for the creation of the Magnascope. The Magnascope was first used at the Rivoli Theatre, New York City, in the latter part of 1926 for the showing of certain scenes in *Old Ironsides*. It involved no great initial expense in its development or any additional cost of operation.

Improvements intended to secure similar effects are of course being used now; but with the equipment devised by us, entirely satisfactory results were secured on an economical basis. This is, of course, always desirable in working up novelties or experiments of this nature.

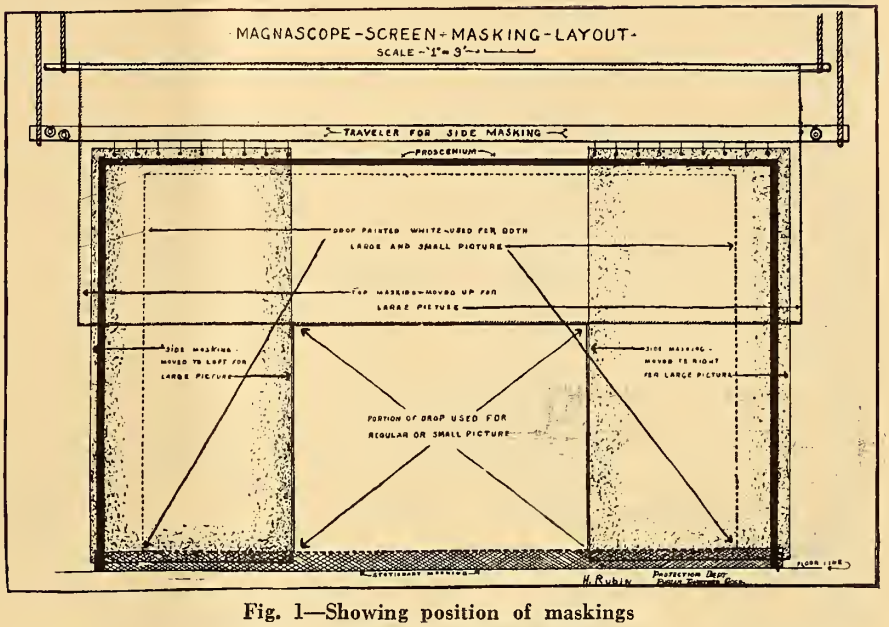


Fig. 1—Showing position of maskings

Small Pictures: A large screen, covering practically the entire proscenium opening, is used, with the side and top maskings set at the proper size for a small picture. (See Figure 1.)

Large Picture: A warning is given back stage about two minutes before the large screen is to be used; instantaneously with the changeover, back stage is given a signal and the side maskings and top border or masking are brought to the desired location for the large picture. During this operation the portion of the picture for the large screen, which is being projected on the black maskings, does not show up and therefore the illusion is created that the picture is gradually becoming larger.

Maskings: The bottom masking for both large and small picture should be the same, and all projectors should be set to hit this masking. The bottom masking of the sheet should be stationary. This masking may be either black velour or velvet, attached to the drop or screen. Two black side maskings, or draw curtains, on a traveler will serve as the side masking for both the large and small picture. In order to keep the picture edge of these maskings straight, a straight edge frame is put on the picture edge with masking firmly lapped around it.

The top masking or border of the screen must also be movable and should be of black velour or velvet, with an iron or wooden edge frame to keep the bottom edge straight. All masking should be as close to the screen, or drop, as is possible.

Screen: A large drop can be painted a good, smooth, flat white.

Additional Projector: A third projector equipped with a special intermittent movement and special lens is necessary; the changeover from the regular machine is made when the special scenes are to be shown.

Intermittent Movement: In the enlarged picture, having an area approximately four times that of the smaller one, it is essential that a maximum amount of light be projected to the screen. For this reason, a special 72 degree Simplex intermittent movement was designed by the International Projector Corporation. This movement is designed to move the film more rapidly between exposures, thereby permitting a longer exposure of the film upon the screen.

Lens Requirements

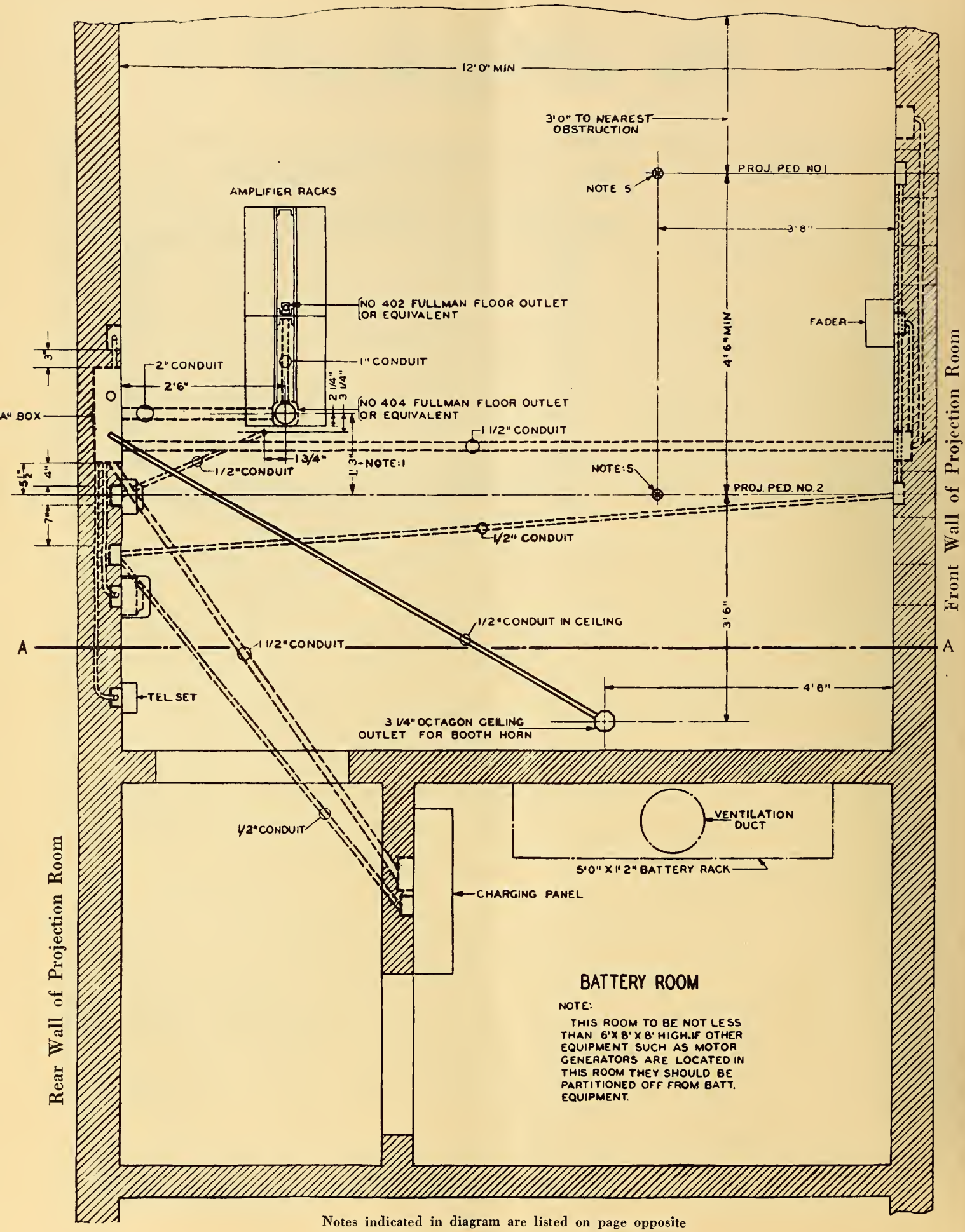
Lens: When a 7-inch lens is used to secure a picture 18 feet in width, and it is desired to secure a picture twice this width, a 3½-inch lens is necessary. Only the highest grade of lens should be used.

Shutter: The revolving shutter blades must be trimmed down as close as possible without developing travel-ghost. Where the diameter of the light beam is small, a shutter blade of about 75 degrees will be found sufficiently wide.

Changeover: The changeover from a small to a large picture should never be made on a title. The beginning of the reel which is to be shown on the large screen should be a scene in which the action is in the center of the frame.

Special Scenes: Massive scenes, such as the naval battle in *Old Ironsides* and the elephant stampede in *Chang*, are recommended.

* S. M. P. E. Transactions, Vol. XII, No. 34.



Notes indicated in diagram are listed on page opposite

Layout for W. E. Sound Equipment

THE accompanying diagrammatic outlines cover the theatre requirements for W. E. Sound Projector Equipment and embody directions for the location and sizes of the major items of the equipment. These outlines are supplemented by the following instructions covering the installation of the component parts of the equipment. It should be distinctly understood that these diagrams and instructions apply *only* to those W. E. installations which will be made after January 1st, 1929.

For the projection room proper the following instructions apply:

There shall be sufficient clearance for the location of the equipment as shown on drawing ASX-5018 (see diagrams).

The projection machines to be equipped shall be spaced so that there is sufficient room around and between them for the equipment, with the minimum spacing between centers to be not less than 4 feet, 6 inches, and with a minimum of 3 feet operating clearance to the left of the left machine.

A reliable source of 110 volts, A. C., 60 cycles or 110 volts, D. C. power, having a current carrying capacity of 30 amperes, shall be available in the room.

Battery Room

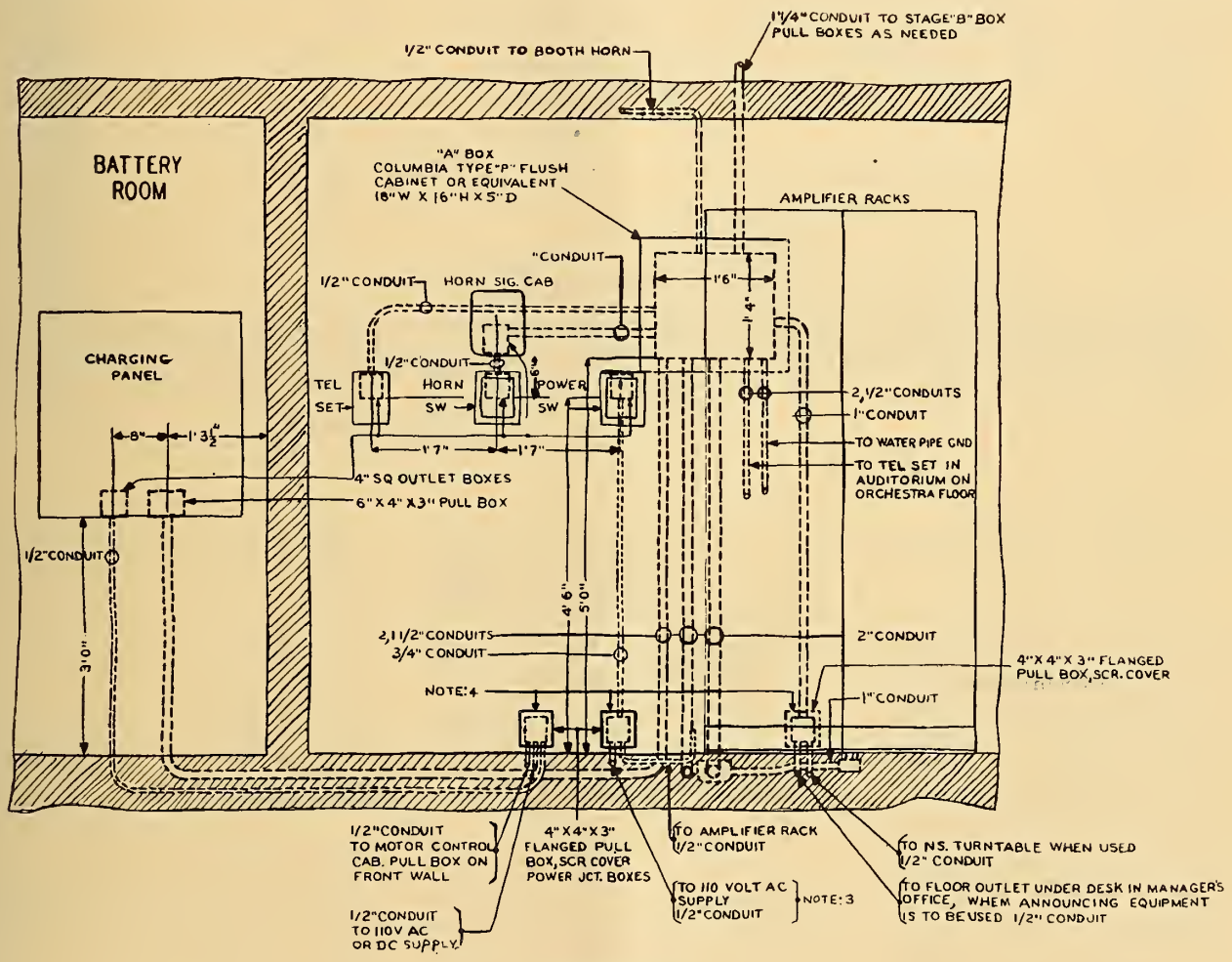
A well ventilated room not less than 6 feet by 8 feet by 7 feet high, situated adjacent to the projection room, is required for the location of the batteries and charging apparatus associated with the equipment.

A reliable source of 110 volts A. C. or 110 volts D. C. power having a current carrying capacity of 20 amperes, shall be available in this space for charging purposes.

The Stage

The screen, which is supplied as a part of the equipment, must be so located on the stage that there is an available space of at least 6 feet behind it to allow for the location of the horn equipment.

The horns may be mounted by suspending on lines, or by placing on a rigid struc-



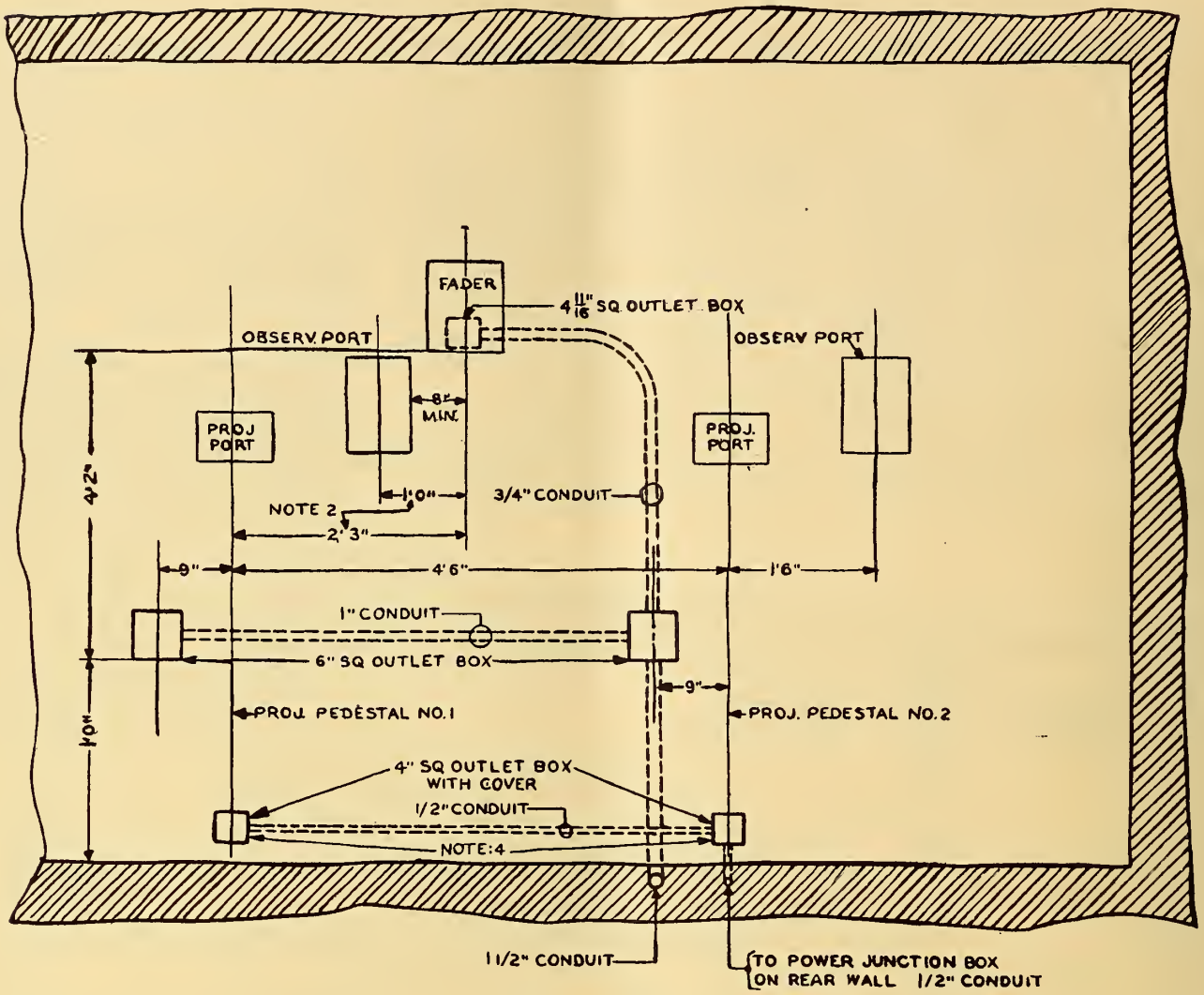
Section B-B

Notes

These details are for the notes indicated by figures in the diagram on the preceding page.

1. This dimension will ordinarily be about 1' 3", but may vary to permit rack to be located most advantageously with respect to room equipment.
2. It may be necessary to increase this dimension to give a clearance of at least 8" to right edge of observation port, as shown.
3. If 110-volt A.C. is not available, this line should be run to outlet box on wall of room adjacent to booth where motor generator can be located.
4. These boxes should be located as close to the floor as local regulations permit.
5. Threaded ends of conduit for projector arc lamps should be brought up three inches above finished floor level at these points.

These drawings apply only to theatres in which W. E. S. P. E. is to be installed after January 1, 1929.



Section C-C

ture, or by playing on a mobile tower to allow for striking.

Amplifier Racks

1-S-41 Equipment: Two racks are used mounted next to each other with their center line 30 inches from the wall to which they are parallel. Each rack requires a floor space 20¼ inches by 15 inches, the longer dimension parallel to the wall. The racks are 68⅜ inches high.

2-S-41 and 2-SX-41 Equipments: One rack is used, mounted with its center line 30 inches from the wall to which it is parallel. The floor space occupied by the rack is 20¼ inches by 15 inches, and is 82⅜ inches high.

Horn and Power Safety Switches: These are standard surface mounting Trumbull switches, located 50 inches from the floor.* The size of each in inches, is 6⅜ long, 7⅝ high, 3⅛ deep.

Telephone Set: This set is used for signal and communication purposes between the projection room and the auditorium. The size, in inches is 5½ long, 6 high, and 7 deep.

702-A Control Cabinet or Fader: This piece of equipment is used for music changeovers and as a volume control. It is located on the front wall of the projection room midway between the two projectors. The sizes, in inches, is 9½ long, 11⅛ high, and 5¼ deep, and is mounted 62 inches from the floor.*

Charging and switching panel, for 1-S-41 and 2-SX-41 Equipments: This panel controls all battery charging circuits. Its size in inches is 31 long, 8 deep, and is mounted 36 inches from the floor.* 2-S-41 Equipments: This panel controls all battery charging circuits, and its size, in inches, is 28 long, 15 high, 8 deep, and is mounted 42 inches from the floor.*

Battery Room

Battery Rack: 1-S-41 and 2-SX-41 Equipments. A two-shelf angle iron rack on which are located al storage batteries is used. Size, 50 inches long, 42 high, and 14 deep. The total weight of batteries and the rack is 800 pounds. For the 2-S-41 Equipment a shelf located under the charging panel is used. Size, 50 inches long by 14 deep. The total weight of the batteries is 250 pounds.

"B" Box: This is the main junction box on the stage, usually located at a height of 7 feet on the rear wall of the stage at the center. Size, in inches: 16 long, 22 high, and 4 deep. The Transvox screen is made of a special fabric, supplied of a size suitable for the picture size desired. It is provided with grommet holes for lacing to a frame. Horns: The horns are located at the rear of the screen. A clearance of 72 inches immediately behind the screen is required.

The telephone set is located somewhere on the orchestra floor of the auditorium. The size is the same as the set in the booth.

As stated above these diagrams and instructions apply *only* to W. E. installations to be made after January 1, 1929.

*** All heights to bottom of equipment.**

In the Chinese Way

Because the moving picture proprietors declined to meet their demands, all employees in the picture theatres in Canton, China, have been on strike for more than a month and there is as yet no indication of a settlement. Amongst other things, the employees are demanding a percentage of the admission receipts, which the theatre owners consider unreasonable. The Bureau of Civil Affairs is endeavoring to bring about a compromise settlement of this strike but as yet has met with no success.

It may be added that while the strike is in progress the employees are occupying the theatres as living quarters and declare that they are still on the payrolls.

Light-Sensitive Cells

III: Actino Electric Effect

By SAMUEL WEIN

IN this, the last of the series of known light-sensitive phenomenas, we will discuss the "actino electric effect." In the year 1817 Willoughby Smith, an English telegraph operator, was desirous of securing a non-inductive, high resistance material to use with a system of cable telegraphy. The element "selenium" was recommended.

Smith took little rods of selenium to which were connected wires at each end. These rods were then placed into glass tubes which were in turn placed in a darkened box. The electrical resistance of these rods were 1400 megohms (a megohm is equal to one million ohms). During his experiments Smith took off the cover of the box containing the crude "selenium cells," and was surprised to note that each time he did so the resistance of the little selenium rods changed.

This remarkable discovery was soon described in technical periodicals the world over, and it was the subject of much discussion among physicists and experimenters. It should be noted here that the element selenium was the first light-sensitive cell known.

The actino electric effect is characterized from the other types of light-sensitive cells by the fact that it changes its ohmic value (resistance) with light; and as an analogous illustration, it virtually does what the "starting box" does, the difference being that the resistance is changed by light and not manually, as is the rheostat.

The number of elements and compounds that exhibit the actino electric effect is very large indeed, and we will describe in this article only those of the better-known types.

Simple Cell Forms

In view of the fact that selenium has such a very high resistance and in order that it can be made into adaptable electrical circuits, it is necessary that the selenium be spread out into extremely thin films and on a large cross sectional area within a small defined space. This is readily accomplished by the now common forms of selenium cell constructions.

The simplest form of cell construction is to wind two wires on an insulating material such as porcelain, lava, mica, etc., with the selenium being applied over these two wires. In Figure 1 is seen the cell in the form of a tube; in Figure 2 the cell form is flat; and in Figure 3 we see the tube form affixed in an evacuated tube.

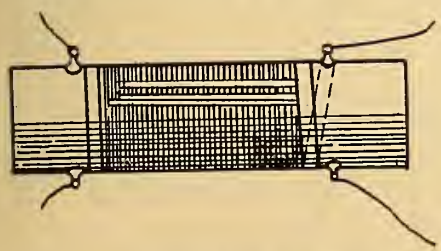


Fig. 1—An insulating tube with two wires embedded in the grooves, and the selenium bridged over the wires.

Other forms of cell construction are obvious, as, for example, when a thin guage of metal is sandwiched in between two insulating materials of similar size, which is then built up as shown in Figure 4.

By far the best construction is that form known as the "grating type." It is made by depositing a film of metal, e.g., platinum or gold, on a glass plate, and thereafter dividing the film into two electrical portions in the form of a zig-zag or circular active form, as is shown in Figures 5 and 6.



Fig. 3—Same as Fig. 1. Selenium cell placed in an evacuated bulb to eliminate atmospheric changes.

Early Uses of Selenium

The early workers with talking motion pictures and the kindred arts were accustomed to use the selenium cell, the main reason for this being that it was readily made by almost anyone and cost very little to make. One of the main reasons why the selenium cell was discarded was because of the "inertia" period which is characteristic of ths type of cell. By inertia is meant the peculiar property of the cell in requiring time to come back to its original electrical resistance prior to its being exposed to a source of light. Various electrical circuits and devices have been designed to overcome this inertia period, with varying degrees of success.

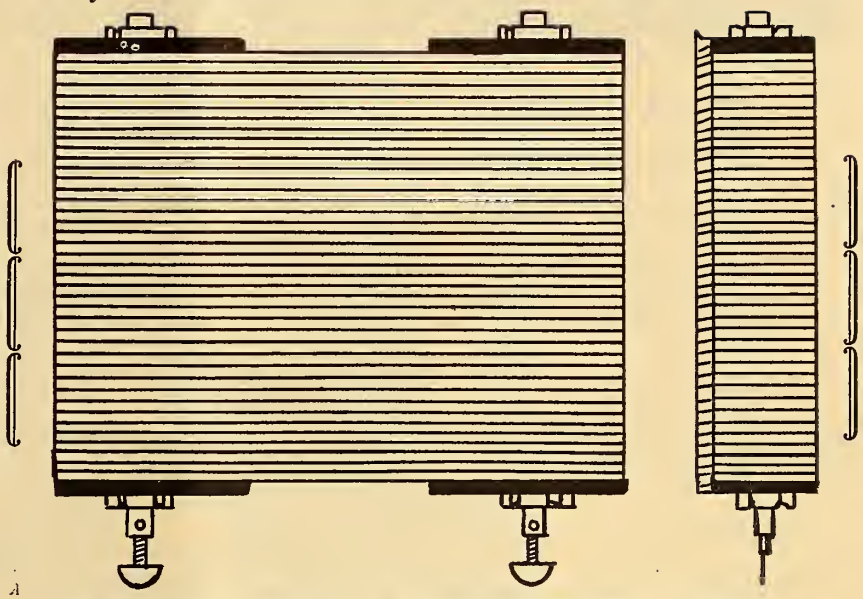


Fig. 4—Front and side view of cell showing metal plates separated by an insulating plate

It is interesting to record here that the DeForest system of talking motion pictures in its present form makes use of a selenium cell of a special type, thus proving that the selenium cell is not obsolete after all.

The Thalofide Cell

Another form of light-sensitive cell is the thalofide cell, employed by T. W. Case, whose sound picture system is known as Movietone. Here Mr. Case uses thallium oxysulphide, a compound made between the reaction products of thallium and sulphide. In the early days of the Phonofilm, Dr. DeForest made use of this type of light-sensitive cell, but it was soon discarded because the thallium oxysulphide changed, chemically, in time to thallium sulphate, which latter compound was unfit for further use, since it was insensitive to light in that form. So as to minimize this slow chemical action Case has placed a colored screen over the cell form, which procedure has increased the life of the cell considerably.

The Molybdenite Cell: This compound is the result of chemical action between Molybdenum and sulphur; either the natural form, known as molybdenite, a native mineral, or the synthetic form can be used as a light-sensitive cell. It is

(*Continued on page 22*)

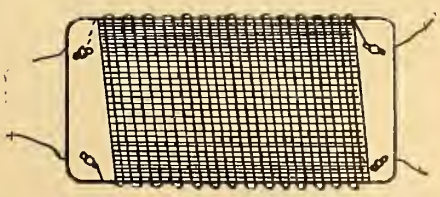


Fig. 2—Here the cell is in a semi-flat (bifilar) form.

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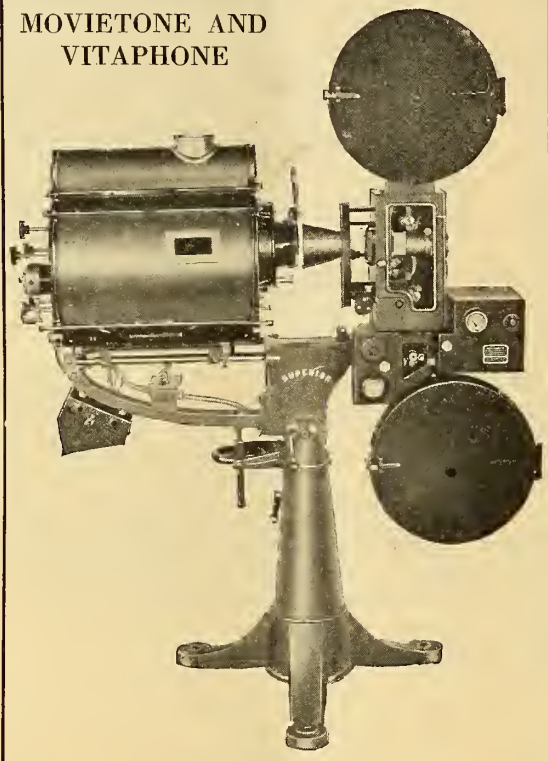
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Projectionists Now Good Feature Story

THE projectionist and his work rise to the plane of providing copy for a full-page feature story in one of America's best-known newspapers! Confirming the expressions voiced in these columns repeatedly of late, is the evidence of the increasing importance of the projectionist and his work in the form of a feature story which appeared in a recent edition of *The Washington Star*.

The story is understood to have been prompted by Walter Bush, chief projectionist of the Washington Fox Theatre, and his staff, consisting of Messrs. Plunkett, Gill, Mitchell, Lehman, and Hamilton, with incidental assistance by Gustave Brocke of the Metropolitan. All these men are members of Local 224, which naturally, 'tho blushingly, accept credit for the enterprise.

Although writen in a somewhat humorous vein, the story deviates only slightly from actual fact and contains the essentials of the projectionists' rapidly increasing importance. The story follows:

New Stage Door

The managers have us fooled. Now they're thinking seriously of nailing up the old door leading to the stage. They say the new stage door must lead to the projection room. Heretofore they had never thought of a projection room in any terms other than a mere projection "booth." They paid a man to adjust carbon arcs and focus spotlights. It was the very last place a manager would care to show a visitor.

Prepare to meet the modern movie theatre's most useful fixture, the projectionist. He is impresario of the orchestra, acoustician of the hall, focuser of high lights and breather of dramatic atmosphere. A man of respectable talents and great responsibility in these days of upheaval. A man with increased income, too.

"My first 14 nights in a sound-projection room," Mr. Projectionist said, "were some 14 nights. Exciting? Wheeee! You don't know the third of it. Think of it. I had voices in the palm of my hand. Just one turn of the knob and they would shriek or whisper. Well, you see, they've taken all the temperament out of the actors. Can't hold out on us any more because of bad colds or headaches. When the curtain rolls up we give 'em the juice and by gum! they sing.

Wins Recognition

"Everybody, from manager down to the doorman, knows who I am. Listen, when silent movies were the vogue they'd look at me with a sour-dough face. Now? Well, the pay envelope is raised to the level of a pay roll. And this is important—when I strolls into my booth, about 11 o'clock in the morning the doorman, the usher and assistant electrician look up and say, 'Good morning.'

"It's a change for the better. And the



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old way is a good riddance of rubbish. Yeh, we projectionists are men of importance these days.

Not a Fairy Tale

"Just a couple of months ago the house bought us $30,000 worth of equipment. (Expert sleuthing has discovered this to be a fact.) The manager said: 'Boys, if you want more equipment to help improve your work, please let me know'." (Immortal words never heard in a theatre before.)

The projectionist has new tools and toys. In some instances the playroom has been enlarged to permit installation of strange contraptions that take up far more space than the old, simple machinery. To the uninitiated the installations present little more than a tangled jumble of sprockets, shafts, chain drives and cables. These are the machines man has made to talk, sing and weep.

The Human Element

But all this has its human element. A breathing man conceived this machine and breathing men operate it. And still the human factor is the one that man is struggling most to overcome. For it is responsible for the bad cues, the cacaphonous sequences and impossible synchronization. In the projection room the projectionist forgets to put a needle into the phonograph arm or else leaves a drop of oil on the sound gate. And the incredulous onlookers and listeners witness a prima donna shape her lips for "love," yet what they hear is "Alabama."

The projectionist, not giving a whoop about Hollywood intrigues, is buried beneath the weight of his own problems.

Deluge of Intelligence

His duties are multiplied manifold. He was forced to open his mind to such intelligence as the bombardment of protons of electrons, the theory of storing electric energy in a wet cell, the Bohr theory, the construction of photo-electric cells and the principles of sound amplification. Here is enough theory and practice for the most learned professor. And it descended with such suddenness and fury that the projectionists are still asking each other whether all this talk about talkies is true.

Consider how easy it is to distort sound waves coming from such films. Their original whispers are amplified in the neighborhood of 200,000 times before horns behind the movie screen throw the waves out to listeners. That's why the projectionist must be so extremely cautious in excluding not only extraneous noises but also grease, dirt and dust that might interfere with the translucency of films.

Care and Attention

There is no end of care and attention to sound equipment. Every morning the machinery must be tested, cleaned and adjusted. If something goes wrong during a performance, things get mighty hot in the room. Patrons give the manager his daily bread, and if patrons are dissatisfied the manager worries himself to a frazzle. Blame must never fasten itself on the projection room.

A new scheme of theatrical management has been adopted in audiovision production.

(*Continued on Page 27*)

Less Heat Insures Better Sound Reproduction

THE projectionist is undoubtedly the one person in the industry most depended upon for the successful presentation of sound pictures, for upon him and his intelligent efforts depend the quality of the projected sound as well as the perfect projection of the picture. Sound pictures and sound projection are the all absorbing topic of the day and the projectionist who would most advance himself in his profession is the one who will consider all angles of the new art.

Much has been written in these columns on the subject of sound projection, and its fundamentals are generally well understood by alert and progressive projectionists. These same projectionists are clamoring for more information which will assist them in perfecting themselves for this important new phase of their work. This is typical of the average projectionist of today and speaks well of the advancement of the craft as a whole.

The subject of heat on the film and its effect on sound projection is new and has not heretofore been touched upon. It presents an opportunity for thought and study that well may be taken advantage of by all concerned in this new art. Heat on the film does unquestionably affect the purity of the projected sound. How? Well, let's reason it out and see.

Fundamental Actions

Fundamentally we have first a film upon one side of which is a photographic record of the sound; we also have a sound pick-up attachment for the projector and an amplifying device. In analyzing the effect which heat on the film bears to sound projection we will be concerned only with the film itself and the sound pick-up attachment for the projector, since it is here that the photographic record of the sound waves is converted by electrical means to audible sound.

As we all know from reading previous articles on sound projection, the photographic sound record on the film is composed of minute horizontal images called sound lines, these sound lines succeeding one another in vertical arrangement within the limits of the narrow sound track. The conversion of these sound lines (photographic images of sound waves) to electrical impulses and thence to audible sound waves is accomplished by means of the optical system of the sound projection apparatus, which system projects a fine wedge of light to the sound lines on the film, this wedge of light being really an image of the slit or aperture in the optical system. The actual image projected on the film is .001 of an inch in height and .080 of an inch in width.

Reference to a recent article by sound projection engineers which appeared in this publication on page 27 of the July issue called attention to the necessity for precision adjustment of the sound projection optical system, explaining that "if the slit image projected on the film is not exactly right, it is obvious that quality of reproduction must suffer." These engineers explain that a lengthwise movement of the optical unit will throw the projected slit image out of focus, such an image not allowing the fine lines and overtones to be picked up clearly. They point out also that if the unit is rotated out of its true position causing the slit image to incline one way or the other from a true horizontal register with the sound lines on the film, the image will slur over the fine markings and the broader ones will be picked up incorrectly. Thus it will be seen that the true pickup in which true tone values will be obtained depends upon what might be said to be a really microscopically correct registration of the projected slit image on the fine sound lines on the film.

Effect of Excessive Heat

Fine! But what has all this to do with heat on the film? That is just the point; it has everything to do with it. When one considers that true tone value depends upon such an exact adjustment of a projected image so small that its height is only one thousandth of an inch, it does not require any great amount of imagination to see how tone value would suffer were a light source employed for projecting the picture which had such an intensity and heat content as would cause warping or buckling of the film.

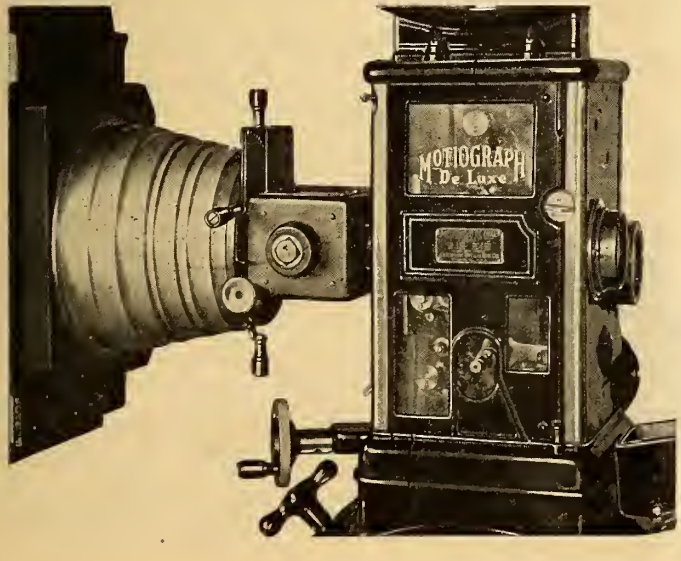
With such a condition, where film warping or buckling exists, the sound projection optical system may be in perfect alignment itself but the buckling or warping of the film would throw the slit image out of its exact alignment with the sound lines on the film through this very warping or buckling action of the film itself.

Most of us know that the tendency for years has been toward crowding every bit of light possible on the film—undoubtedly an evil in some instances where so much light was not necessary but was desired by some exhibitors in an effort to obtain a brighter picture than his competitor. In others it was a necessity for satisfactory screen results by reason of the increasing growth in size of theatres and screen surfaces. At all events it was logical that the demand for more light sponsored the present high-powered illuminants. Unquestionably very efficient devices insofar as light is concerned, but unfortunately as a natural result more heat came with the increased light. We all know that these high-powered illuminants do cause warping, buckling and drying out of the film and most of us have had kicks from the film exchanges about it, that is, those of us that are using high-powered illuminants.

Results of Buckling

Buckling of the film not only gives rise to this condition but to another one as well, inasmuch as when a film buckles it throws the picture surface out of a perfect flat focal plane. This disturbs the critical focus of the projected image on the screen and also has its effect on sound projection in that the tone or sound track comes within what is ordinarily the projected picture surface; therefore, any buckling of the film would tend to throw it out of focus in regard to the projected image of the slit in the sound projection optical system. This

(*Continued on page 24*)



Close-up of cone, shutter and mechanism

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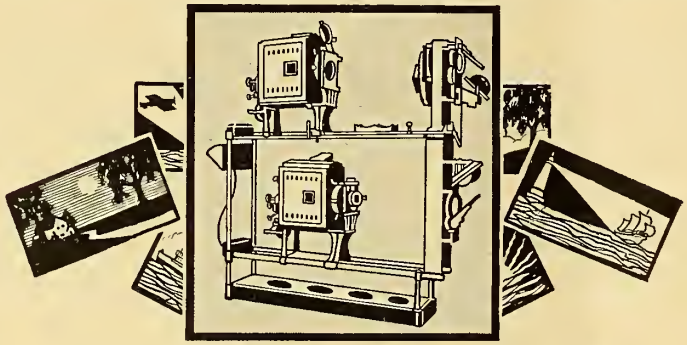
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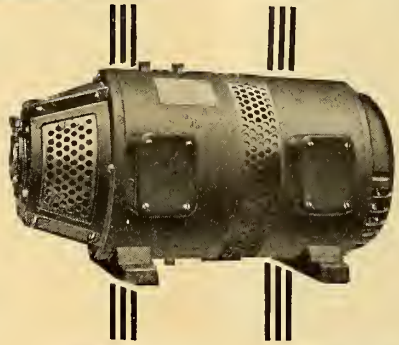
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Light-Sensitive Cells

(*Continued from page* 17)

patented by Dr. W. W. Coblentz of the U. S. Bureau of Standards.

The molybdenite cell exhibits a far less inertia period than does the selenium cell. The simplest cell design of this kind is to secure a thin lamina (crystal), and fasten two wires at opposite ends, and by means of a soft solder be made to hold very rigidly.

Many Light-Sensitive Elements

The Silver Compounds: Natural sulphides of silver, in the mineral form

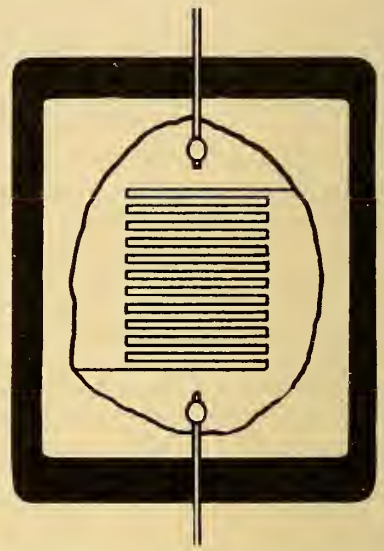


Fig. 5—Platinum deposited on glass plate and divided as shown. (Long view) Selenium is bridged over dividing lines.

known as Argentite and Acantite, as well as the synthetic preparation, as well as compounds of silver, such as the chloride, bromide, iodide, etc., are light-sensitive. There are a number of lead compounds, as well as the natural mineral forms that are light-sensitive.



Fig. 6—The metal film is divided in a circular form.

The number of compounds and minerals that exhibit a change of resistance with exposure to light are very large indeed, and a description of all of them would, I fear, demand a whole issue of this publication.

The effect of light on metals and compounds is a specialized study in itself,

Improved Installation Procedure Near

"Installation procedure is constantly being improved," states Harold B. Santee, head of the Installation Dept. of Electrical Research Products, Inc., subsidiary of Western Electric for the distribution of Vitaphone and Movietone installations, "and within a few months a noteworthy advance is to be made.

"In the present arrangement the driving motor and disc turntable are mounted on individual pedestals, the film reproducer and associated amplifier are supplied as separate units to be mounted on the projector, and the film-discs transfer panel is mounted on the wall of the room.

"Under the new arrangement there will be a single pedestal bearing all of these members. The change will facilitate the work of installation and reduce the wiring needed, and furthermore will make the work of operation more convenient.

The changes mentioned by Mr. Santee are not expected to become effective until after January 1 next, or possibly later.

English Owners Credit Strange "Talkie" Aid

In an address recently before a meeting of British exhibitors the statement was made that an enterprising American inventor had put on the market a small apparatus which consisted of two ear plugs, which would be supplied to those patrons of "sound picture" houses who wished only to see and not hear the picture. One million sets were said to have been sold.

Many such stories are circulating in British film circles, where the uncertainty over "sound" is more pronounced than in America.

and I assume that the projectionist is not materially interested in entering on any such venture, since he has to cope with other phases of the many diversified problems resulting from so many recent contributions to the art of motion pictures.

Much Interest Displayed

It might be said here that the object of offering this series of articles to the projectionist has been attained, for it may not be denied with any truth that the projectionist who has assimilated the fundamentals of light-sensitive elements as set forth in this series is indisputably the better craftsman for having done so—and the correspondence in connection with this material would seem to indicate that many projectionists were eager for information on this phase of their work about which so little information has been disseminated.

The saying "Knowledge is Power," certainly is applicable to the many and varied forces which are edging into the projectionist's work and new developments of which daily are demanding that the real craftsmen in the ranks reach out for more and more information on these new factors which are working so many changes in his profession.

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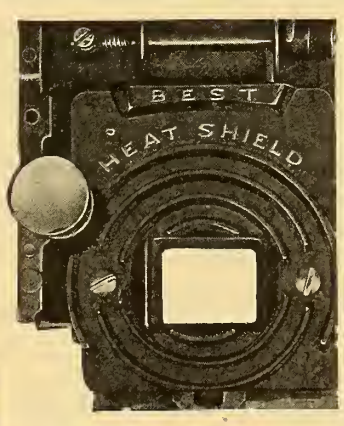
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"BEST" HEAT Shield

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BEST DEVICES CO.

Film Bldg. Cleveland, Ohio

Less Heat Insures Better Sound Reproduction

(*Continued from page* 21)

sets up a condition equivalent to a lengthwise movement of the sound projection optical unit from its correct position, with a like effect on the pureness of the projected sound.

Warping of the film is usually a condition which occurs when the heat causing it is not quite sufficient to create a distinct buckle. However, warping causes the film to wave or to take other forms in passing through the projector which set up various disturbances. Its effect on sound projection is difficult to analyze, since it might cause any of the aforementioned disturbances.

It is a quite well understood fact that for perfect projection it is essential that the film pass through the projector in a true, flat focal plane, as under such circumstances the objective lens is able to transmit to the screen a projected image of the film in perfect focus and with all of the high corrections of the objective lens utilized. In sound projection it is evident that for true tone values and to obtain a maximum of perfection, it is equally important to pass the film through the projector in a flat focal plane since the perfect functioning of the sound projecting equipment depends upon it.

One can easily appreciate the fact that the engineers who developed sound projection accepted as a fact that the film would pass through the projector in a flat focal plane which is as it should, since buckled or warped film is an unnatural condition to projection.

Less Heat Only Solution

However, we still have heat on the film and film still continues to buckle; so what are we going to do about it to secure perfect results, both in projection and sound projection? Until recently nothing much could be done except to either reduce the amperage and be satisfied with poor illumination or let the film buckle and make the best of it. With the advent, however, of the new Model "H" Motiograph De-Luxe projector which was described in these columns in a recent issue, a remedy has been found. It is evident from the thorough and practical way in which the engineers have worked out the heat eliminating feature of this new projector by means of the new type cylindrical, horizontal shutter, that they must have been a step in advance of others in realizing the importance of this heat-on-the-film problem.

In addition to its heat eliminating feature, the new shutter also serves two other purposes, both of which may be considered as a help to better sound projection as well as better screen projection. These are accomplished by the peculiar formation of the shutter designed to promote forced air circulation of such a character as to cool the aperture and the metal surrounding it and to tend to draw free dust from the film before the film passes through the sound pick-up aperture. A point in sound projection not readily thought of is the fact that dust on the film if it lodges in the

What About Color Photography?

(*Continued from page* 11)

picture becomes dark and the colors are indistinguishable.

The "subtractive" method, besides being very complicated, offers no safety in manufacture, and is very expensive. It costs anywhere from five to ten times as much as black and white photography. And, it is only a two-color system—in other words, a combination of red and bluish green, which never produces really natural colors, never produces a pure white and cannot produce a pure black. Experts admit that the "subtractive" or mechanical method, is not a solution to the problem of natural color photography.

"Auto-Chrom" Method Best

Now we come to the last method. The "auto-chrom" method (called the chemical method) is the ideal solution, but no one has succeeded in perfecting a method that could be used for film and paper photography. Lumiére was the first to produce a chemical process with excellent results, but it was limited to the use of transparencies and lantern slides. He has not, however, succeeded in adapting this method to films or paper photography. The "auto-chrom" can be briefly described in the following manner:

In producing the normal black and white emulsion, flower dust, starch grains or similar materials are dyed in the three basic colors of red, yellow and blue, and mixed with the emulsion. If this emulsion is placed onto the plate or film negative, it is possible to obtain a natural color negative. The trouble with this method, however, is that it is too "slow." In other words, the time of exposure necessary to obtain good colors, is too long. For this reason, it cannot be adapted to motion pictures.

Besides this, if these flower dust or starch grain particles are too small, the intensity of the colors is reduced, and if they are too large, the picture will be full of color spots and practically no colors will be visible. The "auto-chrom" method has received a lot of attention, and hundreds of thousands of dollars have been invested in an effort to make it available for film and paper photography purposes, without success. It is very improbable that it will be possible to produce a method that will be commercially feasible. For the last ten years, the "auto-chrom" method has only been able to be used in connection with transparencies and lantern slides, and it is very likely that its use will remain in this particular field.

Necessary Developments

Having covered the above three methods, we have practically exhausted the known principles for the production of color photography, and it is a regrettable fact that none of them permits the development of a method of color photography

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limits of the sound track will create foreign noises somewhat similar to static in a radio receiving set.

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Report RCA and W. E. New Projectors

THE Radio Corporation of America, sponsors of the RCA Photophone system of sound reproduction, is understood to have recently installed one of their new projectors in the Eastman Theatres, Rochester, N. Y., for trial purposes along with their "talkie" system.

For some time now rumors have been afloat that RCA believed their system for sound reproduction would deliver better results if the whole apparatus, including the projector, were to be sponsored by them and designed and constructed in a fashion suitable to its preferment. To this end, it is understood, RCA has caused to be built a projector for their sound system, the first test of which apparently is now under way at the Eastman Theatre.

Western Electric Activity

In connection with this development is the interesting news that Western Electric is actually at work on its own projector for Movietone and Vitaphone. Just how far Western Electric, through its subsidiary, Electrical Research Products, Inc., has progressed in this direction is not known, but the reports of increasing activity along these lines will not down.

The RCA plan for the use of its projector is said to entail the obligatory acceptance of its mechanism along with the sound system, and further that no Photophone system will be leased unless the projector is included in the equipment.

Color Photography

and color cinematography that justifies universal adoption. The process that expects to solve the problem of natural color-photography and natural color-cinematography must meet the following specifications:—

a. The possibility for the use of a normal and standard equipped camera without the least change in same.

b. The negative, as well as the positive film, must be coated with a photographic emulsion only on one side of the celluloid base, the same as a black and white film.

c. The development and printing of the negatives, as well as the tinting and toning of the positive prints, must be just as simple as black and white work. The positive must give perfect and natural coloring and these prints must not substantially exceed the cost of a black and white print.

d The projection of a color film should not require special projectors, which necessitate the discarding of the present theatrical equipment.

e. In the projection of the film on a screen, it must not show any "color-fringes," which is a fault of almost all known processes. Neither must the projection require much more light than the projection of a normal black and white film.

Any process that can meet the above specifications will solve the problem of natural color-cinematography and will undoubtedly find a universal and highly profitable adoption by the producers of films and amateurs throughout the entire world.

Projectionist Now Good Feature Story

(Continued from Page 20)

Where the program changes once a week one night is set aside for rehearsals. Heretofore it was never necessary to rehearse a movie save when the orchestra had arranged special music. But latterly the projectionist has become stage manager, and must be so thoroughly acquainted with the production and its accompaniment that he must memorize every scene and dialogue.

In recording, studios have attempted to give the proper volume to speech and musical accompaniment, but they have been unable to fit the sounds to theatres of all sizes. Hence it falls on the projectionist to "cue" a production's scenes so that he knows when and where to increase or decrease sound volume. Just as an actor memorizes cues to give his lines, so the projectionist prepares a cue sheet that will warn him of proper times to change the volume. The instrument used for this manipulation is called the "fader." Operation of the "fader" is delicate, for the ear must be attuned to distortion and one must be prepared for emergency operation.

For instance, in one of Jolson's pictures the cue sheet reads:

"Reel 1—Cut title: 'Not so loud.' Start motor as Jolson walks away from table, following 'not so loud.' Change over on title; 'One beer, straight.'

"Reel 2—Open 10C. On title: 'Thanks, Grace.' 9A, cue-spoken words, 'Give me five minutes.' Start motor as Jolson walks toward camera. Change motors on C. U. of cigarette girl. 'Wait for the last note'."

The projectionist hangs copies of this sheet near the portholes of his room, and when he is warned by the monitor speaker above his head or when he sees the proper cue on the screen, he makes the proper adjustments.

Picture Most Important Now

As a rule audiovision dramas are longer than the silents. Auxiliary stage programs must be made to fit around the talkies, whereas formerly it was possible to round out a stage program first and fit the movie into whatever time was left over. It is not unusual for a talkie to run 1 hour and 50 minutes, leaving only a short time for the incidental program.

Even seconds are important in the theatre's schedules. The projectionist keeps a log of all his operations, noting the time when each reel and record begins. The prevailing contracts between the managers, musicians and stage hands provide for overtime pay whenever an employe is detained more than two minutes after usual quitting time. And he must be paid for 15 minutes' work, even though he gives but three minutes. Thus a three-minute delay may cost the management $50 or $60.

It happened during one rehearsal that when the order to begin was given no needle could be found for the disc record. The operator hunted high and low while the manager tore his hair and dispatched a dozen messengers to the booth. But to no avail. The record could not be played until a needle was found. The manager himself arrived, raging over his losses and bad luck. He dug his hands into his vest pocket, and, lo! pulled out the hunted needle.

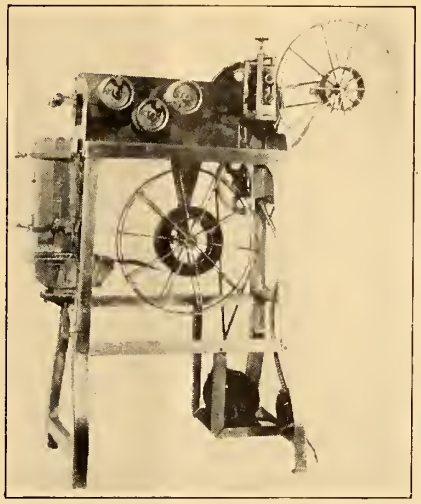
Believe it or Not

A story is told of the projectionist whose ears were so well attuned to static and undesirable noises that he was a victim of his own adaptability. A queer, crackling noise floated through the porthole one performance and he began a close examination of everything about him that might have caused it. Almost frantic lest the manager and audience should grumble, he spent a half hour going over his equipment. He sent his assistant into the auditorium for possible clues, and the messenger came back shortly, saying:

"It's only a guy in the audience eating peanuts."

Producers as well as theatre managers are beginning to harbor sympathy and compassion for the projectionist. Realizing that the success of their films and equipment is dependent to a great extent on the quality of reproduction, the big companies are bombarding the rooms with such a volley of printed intelligence that the recipients are equipped with enough reading matter to start a library.

And that's that—even though we do not believe the last statement.



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Some Novel Projected

(*Continued from page* 10)

tinued to run during the opening of the curtains and during the main title and all subtitles preceding the picture and were not faded off until the actual scenes of the feature were started. Thus the title and all subtitles were seen through a screen of flames which also extended beyond the regular screen at top and bottom and on either side.

A little atmosphere on the comic order was created for *Fireman Save My Child* by making a sketch of the front of a burning building. This was made in the form of a continuous loop resembling the roller hand towels of some years ago. This was revolved while a cartoon of Beery and Hatton was suspended in front of it. The whole was photographed on standard motion picture film. The resulting scene was of Beery and Hatton falling continuously down past the flame-filled windows of the building. This was projected over the entire stage opening for a few seconds just previous to starting the feature. It got a good laugh and prepared the audience for more laughs to follow.

Bridge Over from Prologue

3. *To bridge over from an act or prologue to the feature immediately following:*

In this instance projection was utilized to create realism in the forepart of an anniversary prologue and again in the same act to bridge over the feature which followed. The opening scene on the stage was a drop depicting the front of a typical old Nickelodeon. This drop was raised disclosing an interior. To add realism, a long focal length objective lens was used to project a 9 by 12 foot picture on the miniature screen of the theatre set. The scene then changed to a full stage set, in the center of which was a large birthday cake.

A motion picture had previously been made of the birthday cake. This was projected on a gauze drop let down at the front of the stage as the stage lights faded and continued to run while the screen was being lowered back of the gauze and until the gauze was raised disclosing the regular screen with the picture already started. This made a smooth and pleasing transition from the prologue to feature without any waits or dull seconds between.



Fig. 2—Projector Gate Mask



Fig. 3 — Railroad picture used with observation platform stage set

4. *To furnish part of the scenery or setting for an act.*

One of the most effective stunts where motion pictures were combined with an act was used as far back as Nov., 1924, in connection with a prologue to the showing of Buster Keaton in *The Navigator*. The stage set was a scene laid under the sea with an ancient wrecked ship in the background. A singer costumed in a diving suit was the principal figure in the act.

He was suspended on wire cables and was raised and lowered while singing *Asleep in the Deep*. A gauze drop was used at the front of the stage and on it projected underwater scenes taken from the feature *Twenty Thousand Leagues Under the Sea*. This, of course, contained a variety of fish swimming to and fro and made the scene, which was lighted from the sides in a deep blue-green, appear very realistic.

Special Effect Film

The Honeymoon Express was the title given to a combined film and stage act which was presented with very good success. The idea was to have a scene on the stage of a full-size observation platform of a passenger train. Around this were to be projected scenes taken from a train in such a manner as to give the appearance of the car passing through continuously changing scenery. All film libraries were combed in an effort to find suitable scenes on film, but with no success. It was necessary that the scenes used be taken from the front of a train and that the track photographed be exactly in the center of all scenes used.

First, about 1,200 feet of film were taken over the Adirondack Division of the New York Central Railroad, in which there were many good scenes. The resulting positive had to be trimmed to 700 feet to eliminate certain places where the track ahead moved a trifle off center while we were going around curves. A short motion picture was then produced showing two couples leaving a hotel amid the usual hilarity after a wedding. They were followed to the station and shown boarding a train. Then a scene of the train pulling out and fading away in the distance was taken. All of this first part was shown as a regular motion picture on the standard screen.

Picture *P*resentations

As the train passed away and the picture faded out the screen was quickly raised disclosing the stage set of the observation platform, with the same persons who had previously been shown in the picture, seated on the platform, singing. On either side and above and below the observation car was stretched a screen. This was also carried out on the floor in front of the car. Upon this screen were projected the scenes previously taken from the engine, enlarged to fill the stage opening, of course, and also arranged to project on the floor in front of the car so that the moving track could be seen.

It was necessary to use a special aperture plate for the projector upon which these scenes were run. This aperture had an opaque projection which was carefully filed to the proper dimensions to prevent the picture from being projected upon the train itself.

The platform was then lighted with spots and floods with special effect projectors. No stage lights were used except two red signal lanterns which the porter brought out and hung on either side as we gradually brought a blue filter over the scene to indicate evening at the finish of the act. The effect was, of course, that the audience saw the whole as if they were on another train following the one on the stage through the beautiful scenery of the Adirondacks. (Fig. 3)

A Projected Presentation

5. *To furnish all of the scenery and all of the lighting for an act:*

In this category we have a number *Me and My Shadow* suggested by the song. A picture of a girl in fancy clown costume sitting in a swing was drawn four times on a card, making the images at the extreme sides quite large and the ones nearer the center smaller to give an idea of perspective. (See Fig. 4). The center was left blank and a space calculated so that when photographed on standard film and projected to the full stage size there was room for two real swings to be suspended.

These swings appeared still smaller than the smallest image on the projected film. Two girls were costumed to match exactly the sketch. They were placed in the swings hung just in front of a 30 by 40 white screen. When the curtains in front of this were opened, the projected film was irised on. The blank space in the center of the film furnished all the light for the actual figures and no stage lights were required.

The result was that the audience was not quite sure whether the singers themselves were real or not, until they moved near the end of the song. There was no action in this film but it got across nicely to our audiences and encouraged us to try another.

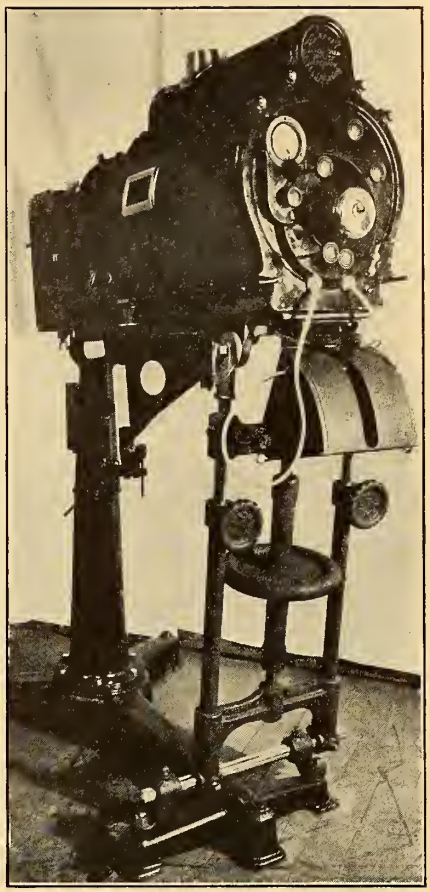
This time we did the job a little better. We introduced animation and for the song *Two Little Pretty Birds* we had an animated cartoon and actors costumed to match, all working in harmony and rhythm with the music. We called the birds penguins; but the photographers preferred to call them ducks. This number was splendidly received by the audiences. (See Fig. 5).

Following is an excerpt from a letter written by J. I. Crabtree, Chairman of the Papers Committee of the S.M.P.E., to Eric T. Clarke, Managing Director of the Eastman Theatre under date of Aug. 17, 1927:

"We as engineers want to know wnat the exhibitor wants. For instance, Mr. Zukor announced recently that the Magnascope, which is simply an extra lens attachment to magnify the picture on the screen, was the greatest advance in projection during the past twenty years. From a showmanship standpoint perhaps this is correct, but no engineer would think so because the stunt is so simple and obvious.

"However, it seems to me that engineers could work out a lot of similar stunts if they were only urged by the exhibitor.

(*Continued on page* 30)



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Fig. 4—"Me and My Shadow" Design

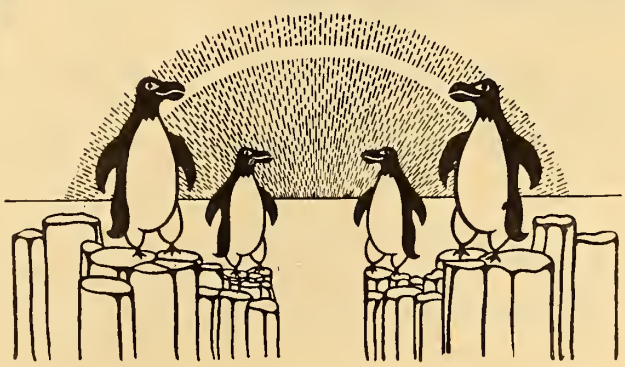
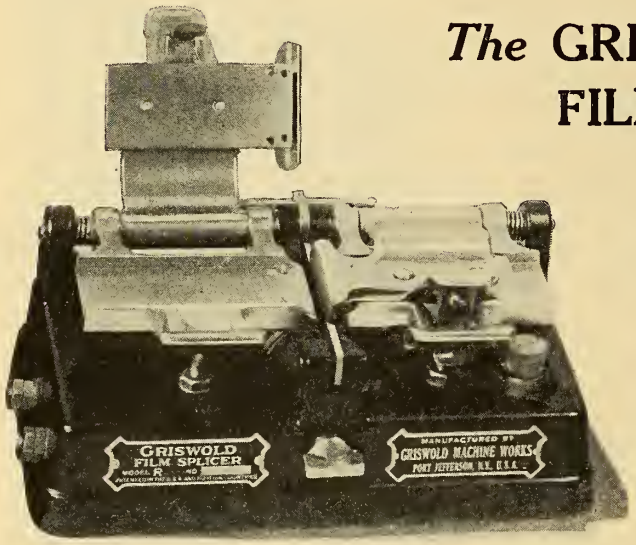


Fig. 5—Penguin Design

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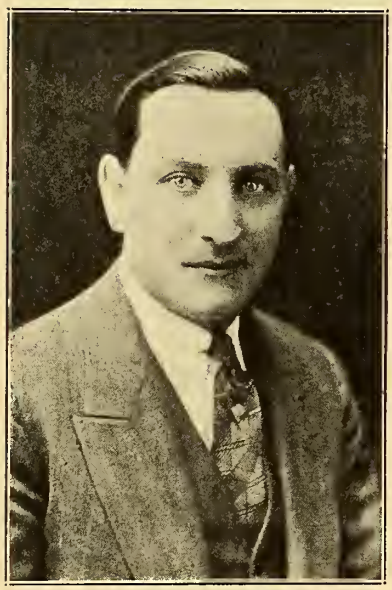
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We are also interested to know what he thinks of Widescope, or double-width pictures."

New Equipment Unnecessary

It is safe to say that the Magnascope is not really a new idea nor does it involve any special mechanism or optical equipment. It is merely making good use of available equipment.

Let us go back to the methods practised by Lyman H. Howe. Why did not the theatres that were erected later have just as large pictures, in proportion to the size of the house, as Howe used? The answer is simple. The theatres were made much larger. Light sources were then inadequate; projection optical equipment was inadequate. The film itself showed graininess, if enlarged too much, and the general quality also suffered considerably.

By reason of all this, the theatres were compelled in many cases to limit the size of their projected picture. Meanwhile, there has been a gradual improvement in projection, an improvement which is still going on and will continue. We now have the high intensity arc. With this we have some great advances in the optical equipment used to collect this light. We also have much better objective lenses for projection.

The necessity of keeping the size of the projected picture within small limits was partially overcome by the use of close-ups, and semi-close-ups.

In some cases features have been made in which there were more close-ups than long shots. When the opportunity came to show a picture of really big dimensions it was quite natural that it should make a great impression. It was like being let out of doors after a long illness. The audience could see the character as large as in ordinary close-up, with plenty of background also.

Larger Picture Desirable

It would appear that it might be good for theatres to use slightly larger pictures in many instances. It would not be wise to increase the size to the extent that all pictures would fill the stage openings, because this would lead to monotony in the other extreme. It would be interesting to see a feature, with all scenes taken at long enough range, so that the entire picture could be run on a large screen.

Mr. Crabtree asks what the exhibitor thinks of the "Widescope." The answer is that it is problematical. If "Widescope," or double-width pictures are desired, it seems hardly necessary to go to the great trouble and expense involved by using double-width film, special projectors, etc., when it would be quite possible to get the same result by using standard film and masking off a portion of the top or bottom, or both, and then using the proper focus objective lens to project the picture to the size desired.

Projectionist's Capabilities

The different ideas mentioned at the beginning of this paper are not put forth with the thought that the Eastman Theatre is or has been the only theatre to do these things. We fully realize that some of the stunts have been crude and that engineers

Where to Buy *Good* Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

These Dealers, by the fact of their being on this page, show that they value your friendship and your good-will. They appreciate your importance as a buying power. Instead of ignoring your existence or trying to reach you inexpensively by reaching your theatre manager, they are advertising direct to you. Let this show of good-will be mutual.

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SOUTHWEST Theatre Equipment Co., 321 North Main St., Wichita, Kansas. Jobbers and Distributors of Equipment. Get our prices on what you need. Address your inquiry, attention C. D. Peck, Manager, member I. A. T. S. E. No. 414.

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probably can think of many ways to improve upon them. We hope they will, and that these few things may suggest other ideas that will be put to use.

It is desired to state here that in each case mentioned above as soon as the Managing Director, Eric T. Clarke, approved of the idea presented, he turned the proposition over to the supervisor of projection completely. We and the other members of the projection department were given free rein to go ahead and produce results. It is only natural that these things should be handled in this way.

For instance, in connection with the railroad act, no one could be better acquainted with just how these scenes should be filmed than the man who was responsible for the proper projection of them. Let's not get in a rut. There are many good projectionists throughout the country. Give any one of them something out of the ordinary to do—*then back him up.*

He will put it over. Many more dollars will be reaped through the box office than will have to be paid him for the extra work or for the expense involved in a little additional equipment.

Clean Film Campaign

A CAMPAIGN is now under way to effect the cleaning of sound film by all exchanges before it is shipped to the theatres. Due to the fact that foreign substances on the film cause clicks when passing through the aperture, with a resultant distortion of sound values by means of the sound being amplified tremendously, the industry now recognizes as serious the problem of keeping the film clean.

The subject has engendered much discussion as to just when the film shall be cleaned, whether before leaving the exchange or in the theatre. Exchanges are now understood to be shipping out sound prints in excellent condition, but this, if a fact, is not a guarantee that the film will not become dirty after the first day of use.

How Many of These Can You Answer?

What would cause a commutator motor to balk at starting?

What equipment would you suggest be purchased for installation in a *first class projection room?* How many projectors, spots lamps, motor generators, effect lamps, rewind, and size of projection room, etc. If you were asked if reflector arc would be better than high intensity lamps for a long throw and a large picture, what would be your answer, recommendations, and why? Here is a difficult question and one that will require thinking and lots of it.

Why is it necessary to have a longer focal length stero lens than a M.P. lens for the same size picture? —W.T.

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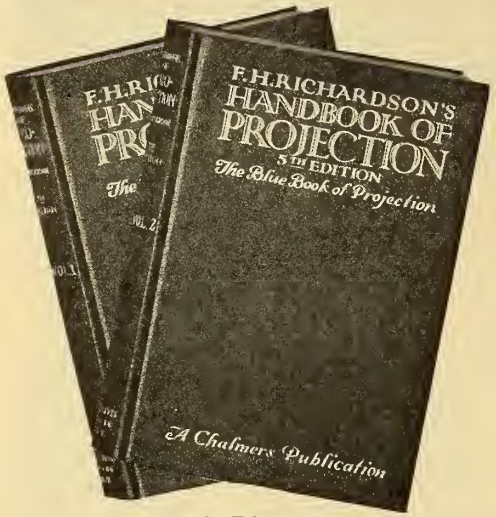
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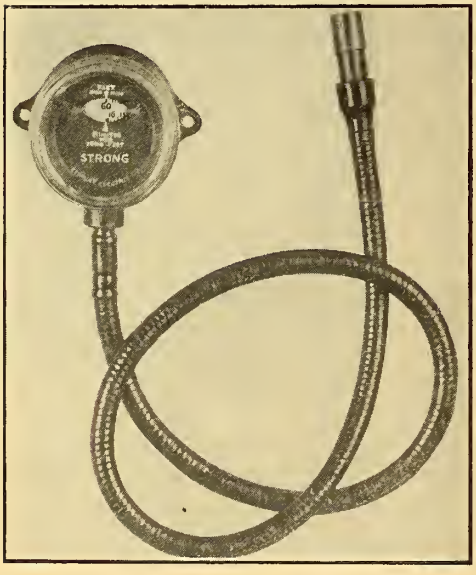
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Engineers Discuss Projection Speed

AT a recent meeting of the Society of Motion Picture Engineers, Harold B. Franklin, President of West Coast Theatres, Inc., in reading a paper on *Theatre Management* happened to mention the need for allotting ample time for the projection of the feature picture in the scheduling of the program. His remarks on this point led to the following discussion between Mr. Franklin and other members of the Society:

Mr. Franklin: We have managers who are pennywise and pound foolish and do not give proper consideration to this subject, managers who think that by running a picture fast, they are doing the theatre good. They are much mistaken. It may result in temporary box office receipts, but it does considerable harm, in my opinion, to the picture.

Mr. Cuffe: With regard to projection speed, it might be well if the managers would get together with the producers and get shorter pictures. Half the productions are too long, and that is why they are run fast.

Pictures Too Long

Mr. Franklin: Many of those connected with the business end of the industry do feel that pictures are too long. . . We cannot be arbitrary when we see pictures like *The Covered Wagon* and *The Big Parade*. I think there is less cause for complaint on this score than a year or two ago.

Mr. Pollock: The average speed in a theatre is about ninety feet a minute and the taking speed about sixty. We who are cameramen try to run the cameras faster. Some action takes longer. The manager insists that the projection be faster. If they are going faster, we must. The person who loses is the one paying for the prints. If there is an optical advantage in running faster, and you arrive at a standard, the industry will be much benefited. I have seen pictures than have been totally spoiled by speedy projection, and it is essential that we get the attitude of the theatre manager on this.

Mr. Jones: A discussion of this kind is very valuable as it is our opportunity for getting the point of view of the manager. We have established certain standards for the projection speed; now, are we right or wrong?

Music Fitted to Film

Mr. Rose: I should like to ask if the musical program does not have a great deal to do with projection speed. I have been in the Capitol Theatre (N. Y.), and four o'clock was the time for completing the program. There was a signal from the orchestra leader and the finale of the picture was shown at 120 feet per minute.

Mr. Franklin: It is very serious to try to fit motion pictures to music. Music is merely an accompaniment to motion pictures, and if you cannot fit it, it is better

to omit it. The Capitol is trying to make motion pictures fit music, which, I feel, is a mistake.

Mr. Townsend: In the Eastman Theatre (Rochester, N. Y.), where we have one of the finest orchestras in the country, we pay a great deal of attention to music. The pictures, however, are not run to the music. The speed is determined first and the music is fitted to that speed. Speed is one of my greatest bugaboos and I have never been reconciled to the standard of the Society. I am not satisfied that a picture can be taken at 60 and projected at 85 and give normal action.

Mr. Cuffe: With regard to the speed of projection, I think that 90 is a good standard speed. I don't know whether Mr. Townsend will agree with this, but with a speed less than 90, the wide aperture and the small cutting blade, we will have flicker on a very large screen. It is almost essential therefore to run at 90.

President Cook: For the benefit of those who are not familiar with the considerations which preceded the adoption of the projection speed recommended, I am going to ask Mr. Jones to state the reason for the Society adopting this recommendation.

S. M. P. E. Recommendations

Mr. Jones: I am interested in this subject since at the present time I am interested in the work of the Standards Committee. I feel we are in an anomalous position in recommending 60 feet per minute as standard taking rate and 85 feet per minute as standard projecting rate. Careful tests were made some years ago which showed that with the projection machines as manufactured at that time any projection rate under 80 tended to show flicker.

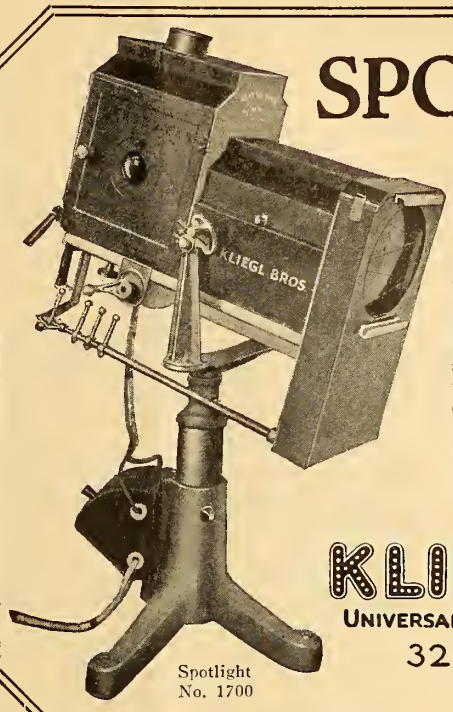
As screen brightness rises, this tendency to show flicker increases, and hence the present tendency to increase screen brightness would indicate that we cannot safely decrease the rate of projection.

Mr. Park: The idea of speed is a psychological illusion. A newsreel is the worst thing, because people think that you are running too fast. The patron therefore thinks you are speeding up the show.

Mr. Franklin: I think that if distributors had a better system through which exhibitors could be appraised in advance of the length of the picture, it would help, because many pictures are dumped at the exhibitor's doorstep the morning of the play date, so that he doesn't know the length of the picture and most use it, because he has paid for it and must run it. The time will come when there is closer cooperation between the exchanges and exhibitors.

Strong Lamp Wins Favor

The Strong Electric Company of Toledo, Ohio, reports an enthusiastic reception for its new baby Strong Lamp. Since its introduction to the industry slightly more than a month ago, many installations have been made, and reports results secured would seem to indicate that the new lamp is a worthy successor to its big brother.



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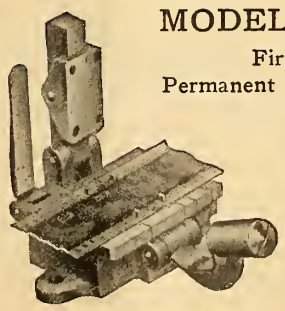
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Answers on Storage Batteries

By NAT HEWITT
Local 306

ANSWERS to the questions on the operation and maintenance of storage batteries which appeared in the October issue are given below. This group of questions and answers covers information which has been detailed in previous issues and were offered to enable the projectionist to check-up on how well he had absorbed this information.

1. (Q) What is meant by specific gravity of electrolyte in a storage cell?

(A) It is the density or weight of one cubic centimeter of the solution, as compared with one cubic centimeter of chemically pure water. Specific gravity is obtained, or measured, by the hydrometer.

2. (Q) What is the normal voltage of a lead cell fully charged?

(A) Fully charged and on open circuit, the voltage is about 2.08 volts; but with new cells immediately after the charging current is cut off, the cells may indicate as much as 2.5 or 2.6 volts per cell.

Storage Cell Capacity

3. (Q) What is meant by the capacity of a storage cell?

(A) The capacity of a storage cell is determined by the quantity of current, in ampere hours, which may be taken from it under normal conditions. An ampere hour is the quantity of current passing through a circuit in one hour's time, when the strength of the current is one ampere. Electrical Research Products' sets for Vitaphone and Movietone employ a storage battery unit of 120 ampere hours capacity; for example, 7½ amperes of energy may be taken from this cell for a period of 16 hours, or 1 ampere for a period of 120 hours. This ratio does not hold good at all discharge rates.

4. (Q) What is meant by the normal rate of discharge of a storage battery?

(A) It is the current in amperes which may be taken from the cell without injury to the plates. The normal rate is generally indicated by the maker of the cell.

5. (Q) How do you keep the quantity and the specific gravity of the electrolyte correct?

(A) Specific gravity readings are obtained by means of an instrument known as a hydrometer, which consists of a glass tube, loaded at one end with mercury or lead shot, and having a calibrated scale giving by direct reading the gravity of the solution.

This bulb is lowered into the solution, and the gravity is determined by noting the scale reading of the liquid. If after a battery is fully charged the specific gravity is below normal, it is then necessary to add a small amount of acid. In ordinary service, however, the projectionist is only required to add water from time to time to take the place of that lost through evaporation.

6. (Q) What kind of water do you put into storage cells?

(A) Chemically pure water, free from mineral properties.

Two Types of Cells

7. (Q) Name two distinct types of storage cells and state the precautions necessary to keep them in good condition.

(A) There are two distinct types of cells: the lead cell, with an acid solution, and the nickel-iron cell, with an alkali solution, the latter being known as the Edison cell. Both types of cells must be supplied with water from time to time to take the place of that lost by evaporation.

The lead cell must be placed on charge when the voltage has dropped to 1.8 volts. The Edison cell must be placed on charge when the voltage has dropped to 0.9 volts per cell. The full charged voltage of an Edison cell is 1.2 volts; that of the lead cell about 2.08 volts.

8. (Q) Without a hydrometer, ampere hour meter or any sort of indicating instrument whatsoever, how may one determine when the charge of a storage cell is complete?

(A) In the case of lead cells, this condition may be determined by noting the period of gassing. More clearly, if the charge be continued for a period of from 2 to 4 hours beyond the time at which gassing begins, one may be assured that the charge is complete.

Pertinent Facts on Good Screen Results

The minimum picture width should not be less than about one-seventh the distance from the screen to the most remote seat in the theatre, and the maximum picture width is such that the angle formed by lines connecting two sides of the picture and the eye of the observer in the first row of seats *does not* exceed approximately forty-five degrees.

The height of the screen is three-fourths its width, except in cases of picture distortion due to faulty projection room location.

Distribution of Light

The distribution of light from a projection screen surface can be controlled by the choice of material, its finish, texture and configuration. The proportions of the theatre, the range of the seat elevations and the position of the projection room with reference to the stage must all receive careful consideration in the selection and mounting of the screen. The relative size of the screen image is in its direct proportion to its distance from the projector.

When light is projected at a considerable vertical angle from normal to the screen, the picture will be noticeably wider at the bottom than at the top. The distortion of the picture as well as the distribution of the screen brightness to all parts of the audience accordingly imposes limitations in the designs of a theatre.

Placing the projection room lower than in newer theatres, will assist projection has been common practice in the past, even materially.

Requests Aid on Prints

Associated Theatre Owners of Indiana has sent a plea to its members for co-operation in curbing the print mutilation evil. Prints are being returned to exchanges repaired with pins and paper clips, in one instance causing severe injury to the hand of an inspector, the association says.

"We urge all of you to caution your operators against returning prints pieced together with pins or paper clips," the association warns. If your operators are too lazy or too incompetent to make paper patches it would be better for them to return the prints with the break in the film rather than to put pins or clips in them, which generally lead to injury of film inspectors. If these injuries result seriously some of you may face a suit for personal damages from these injured inspectors."

100% Renewed

The following Local Unions have sent in their checks in payment for the renewal of the subscriptions for their entire memberships as a matter of Local procedure and without solicitation: Local 248, Dayton, Ohio; Local 303, Hamilton, Ont., Canada; Local 650, Westchester County, N. Y., and Local 253, Rochester, N. Y.

All of the above Locals were 100% subscribed to THE MOTION PICTURE PROJECTIONIST from the first issue in October, 1927.

Where the Money Goes

The United States uses approximately half of all electrical current generated throughout the world. The total cost of all this electric power is about $1,800,000,000 each year, of which about $450,000,000 represents the domestic costs to some 16,000,000 customers.

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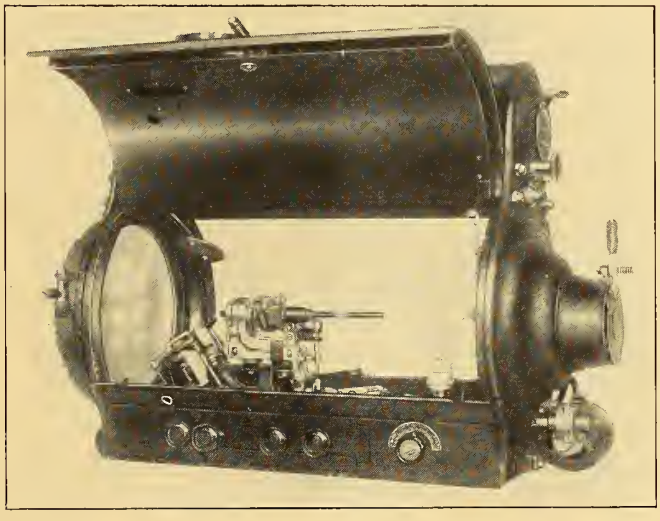
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Theatre, movies and similar amusements	934,000,000
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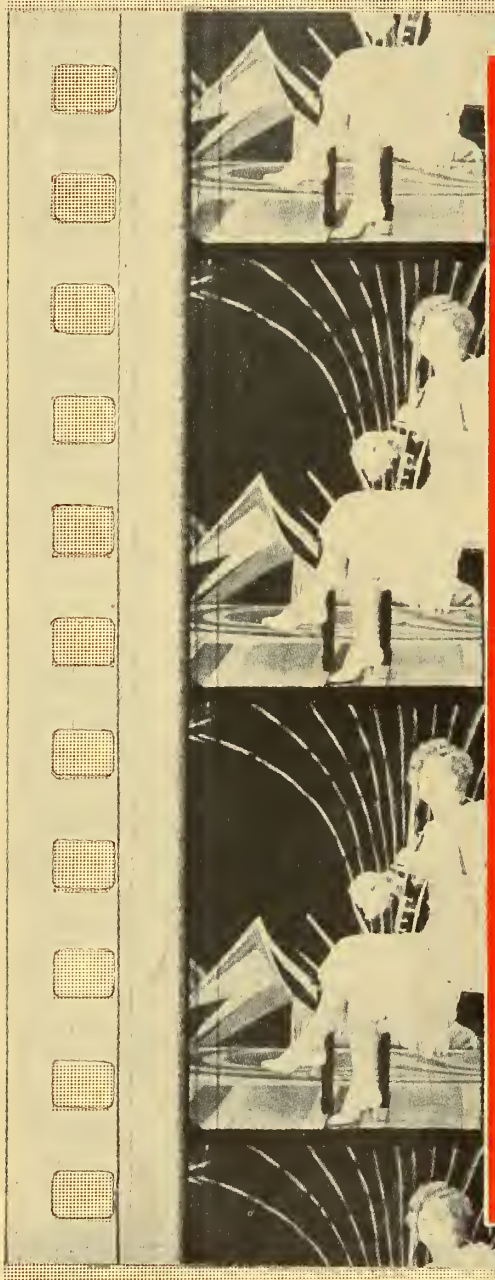
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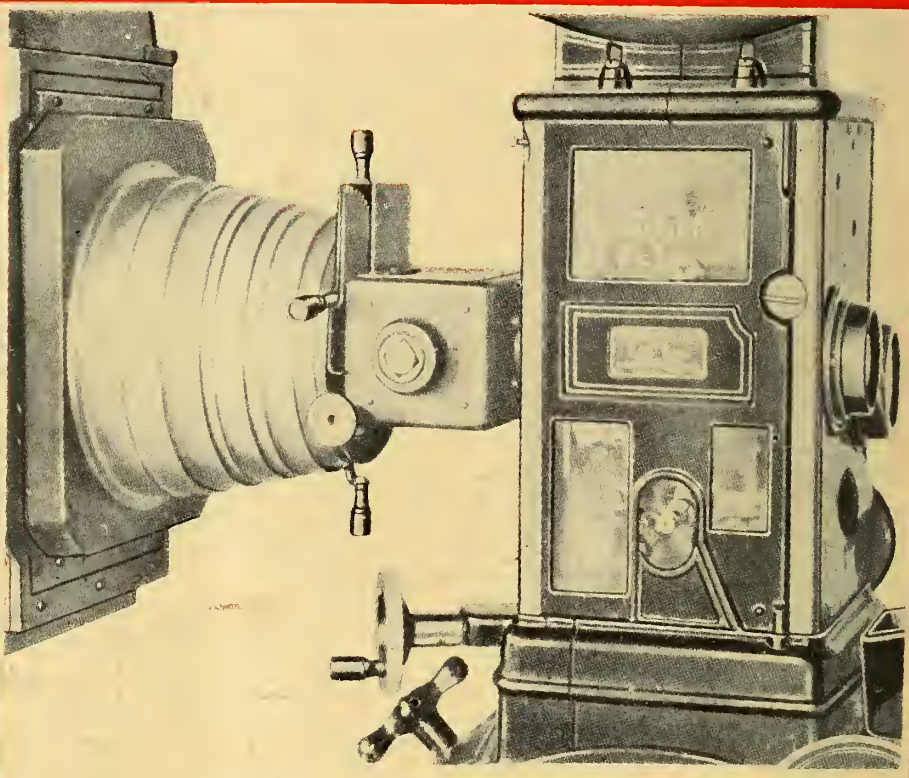
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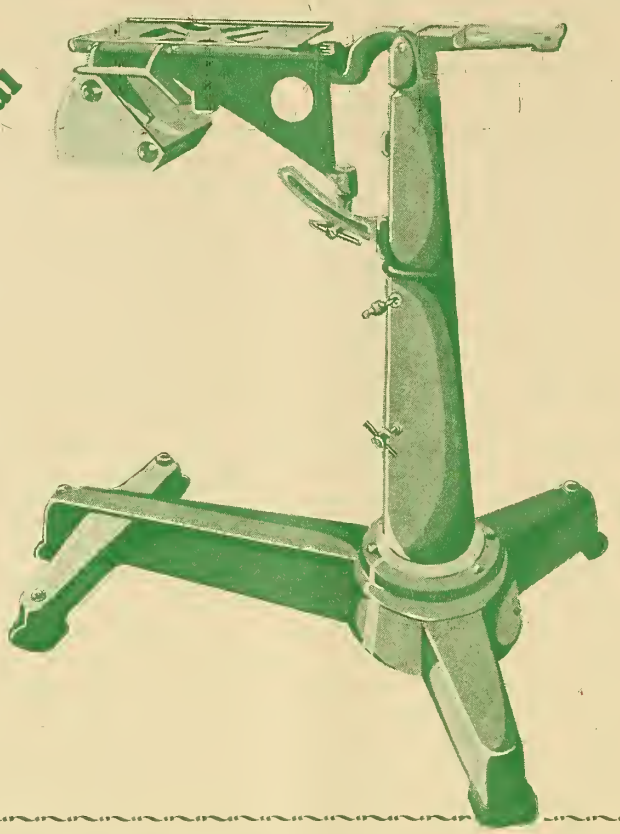


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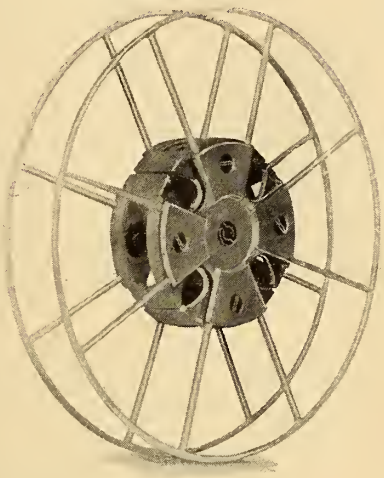
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THE MOTION PICTURE PROJECTIONIST

DECEMBER, 1928 The Motion Picture Projectionist, 45 West 45th Street, New York Vol. 2—No. 3

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Oliver M. P. Supply, Cleveland, O.
Queen Feature Service, Birmingham, Alabama.
J. M. Rice Co., Winnipeg, Canada.
Southwest Thea. Equip. Co., Wichita, Kan.
Wright & Macomber, Providence, R. I.

New York Guild Theatre Permits Novel Effects

A NEW theatre is being erected in New York for the Film Arts Guild which promises something new in the way of novel presentation effects. The spectator in this theatre—it will seat 500, all on the same plane sloping down to the stage—will find himself in a hall resembling the inside of an ordinary camera with the bellows extended. He will be facing, as the photographic film does, the camera's shutter.

Screens for Walls

The walls of the theatre are parallel, but he will not see them, for, placed out from each of them is a black screen that spans the entire hall, running at an angle to meet the stage arch. These two black screens are 55 feet long and 20 feet high. They are joined overhead by another black screen that shuts off the entire ceiling and slopes down to meet the top of the stage arch. It is 55 feet long, 38 feet 6 inches wide at the back, and 27 feet 6 inches wide at the stage arch.

New Stage Form

The stage itself has a completely new form, called the "screenoscope," which provides new openings for the screen, eliminating the proscenium and the usual curtains. In a war film, for instance, this theatre would allow the spectator to see long lines of trucks, as in "The Big Parade," running down the screens at his side and airplanes flying over his head on the ceiling screen, while the personal drama was being enacted on the saucer screen on the stage.

A multiplicity of effect machines will permit the utilization of the three black top and side screens for the screening of effects to carry out the tone of the picture.

5-Day Week Plan Gains Strong Support

Declaring that substantial progress has been made toward achieving labor's goal of the five-day week, President Green said that the shorter week "is a necessary accompaniment of the increasing use of machines and mechanical power."

"Five hundred and fourteen local unions report that their members are now working a five-day forty-hour week," said Mr. Green. "A total of 165,029 members of organized labor have won this new advance in shorter working hours.

"These striking gains, made almost entirely since the federation announced its five-day week policy at the Detroit convention two years ago, prove that the establishment of the five-day week is both practicable and possible. The federation will continue to work for further introduction of the shorter work week in industries where the adjustment can be made."

According to Mr. Green machines are increasing production "at such rates that unless constructive control is developed at the same time, increased quantities of products may flood our markets and result in business depression."

He foresaw in the movement for the five-day week that "constructive control."



HEWES ADJUSTABLE SPOT LAMP JAWS

will place your present type lamp in the $300 class, but lacking the bulk. These jaws operate up and back and sideways; the top and bottom are interchangeable, the set screw is always toward you on right- or left-hand doors. *Built to last*, and will carry 75 amperes. $6.00 the set, ready to install.

Genuine 2 in 1 Film Cement

VITRO Lamp Colors—Perfumes—Crystal Fumes, Stage Lighting Equipment—Effects, Etc.

Made by

HEWES-GOTHAM CO., 530 West 50th St., New York City

Worn Out Projectors and Defective Parts are Costing Exhibitors Millions of Dollars Every Year in Loss of Patronage and Injury to Prints

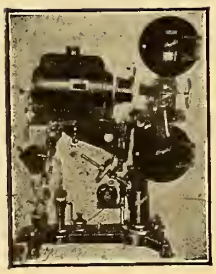
THE NEW

MODEL M SIMPLEX

is Replacing Earlier Models

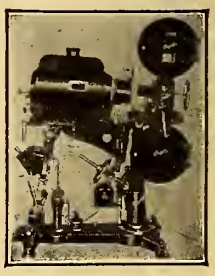
SIMPLEX PROJECTORS

In Hundreds of Theatres
Were Found Readily Adaptable
and Have Proved
Thoroughly Satisfactory
For All Sound Systems



International Projector Corporation

90 Gold Street New York, N. Y.



W. E. System Operation and Maintenance

By RUDOLPH MIEHLING

Projection Dept., Publix Theatres Corp.

THE advent of the presentation of "sound" projection in the theatre has elevated the projectionist, meaning each and every one of you, to an enviable position among all other theater employees. It rests solely upon you as to whether this advance, meaning goodwill and esteem which the theatre operatives hold for you, will continue or die.

In order that this form of entertainment may at all times, now and in the future, be presented to the patrons of your theatre in a most credible manner, you must put yourself in a position wherein you will be perfectly at home with the apparatus used for this purpose and which has been entrusted to your care. The importance of the last consideration—the fact that the projectionist is the man on whom the success of sound pictures depends—cannot be emphasized too strongly.

Never in the history of the motion picture business has so much time, energy and labor been expended in order that you may become proficient in your work—and during this process of education you are enjoying all the benefits which have accrued. Therefore, you owe it to yourself and to your officers, who have made the last-named conditions possible, to do all that you can to educate yourself in this new art.

I want to impress this upon you strongly, for I believe *the time is coming when only the first-class experienced men will be in demand*—men who can produce the best work.

I have been delivering talks such as this to the projectionists throughout the country, and upon my reentry into the territory some time later I was very much pleased with the improved quality of work which was produced.

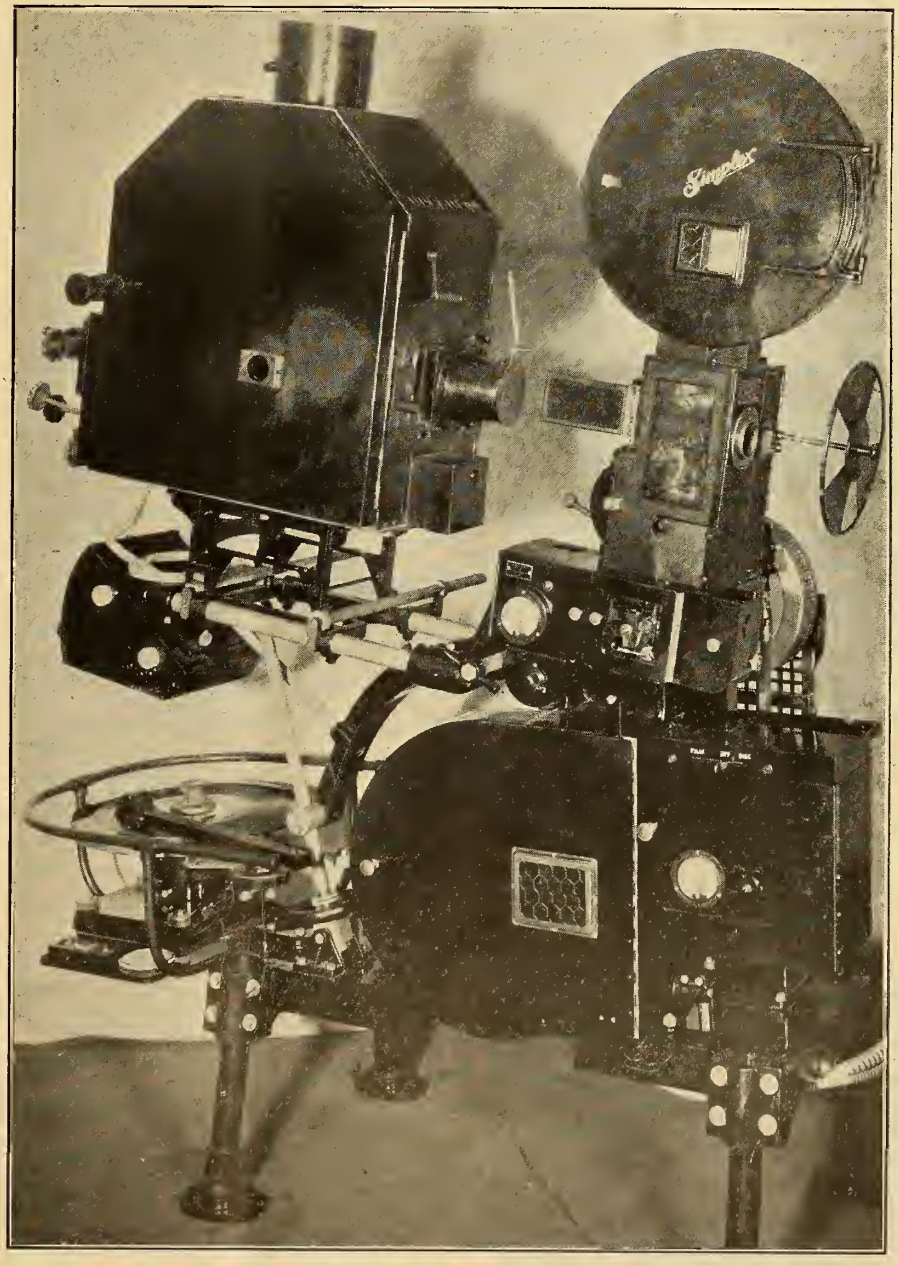
It is my aim to give you information on the principles and methods employed, so that you will be in a more receptive mood to absorb any future knowledge you may gain on the subject; also, this information will enable you to know your equipment better, thereby enabling you to put in a 100% performance and in the event of a breakdown to make such temporary repairs or adjustments necessary to keep the show running, leaving the permanent repairs to the engineers and service-men of the company which has installed the apparatus.

Eliminations of various frequencies always results in an inferior quality of sound. It is important, therefore, to remember *not* to hang anything on the system in an effort to eliminate surface noise or other noises which you attribute to this

RUDOLPH MIEHLING, before assuming his present duties with Publix Theatres Corp., was associated with Electrical Research Products, Inc., as an installation engineer for Western Electric sound picture systems. Mr. Miehling, a graduate electrical engineer and one of the leading projectionists in the country, has accumulated much pertinent knowledge on the operation and maintenance of sound picture systems, and the accompanying article represents the greater part of a lecture given by him recently to the membership of Local 306 at the invitation of its officers.

Although many projectionists are familiar with certain phases of sound picture systems as set forth in this article, Mr. Miehling's effort is the first time that the system has been explained particularly from the projectionist's point of view, and with such detailed information of the component parts.

Experienced sound picture projectionists, as well as those who have yet to work with sound, will find much of value to them in this article.



W. E. projector equipment complete, showing new E. R. P. I. base. This equipment is adaptable to the Simplex, shown above, the Powers and the Motiograph projectors. Note compactness of base.

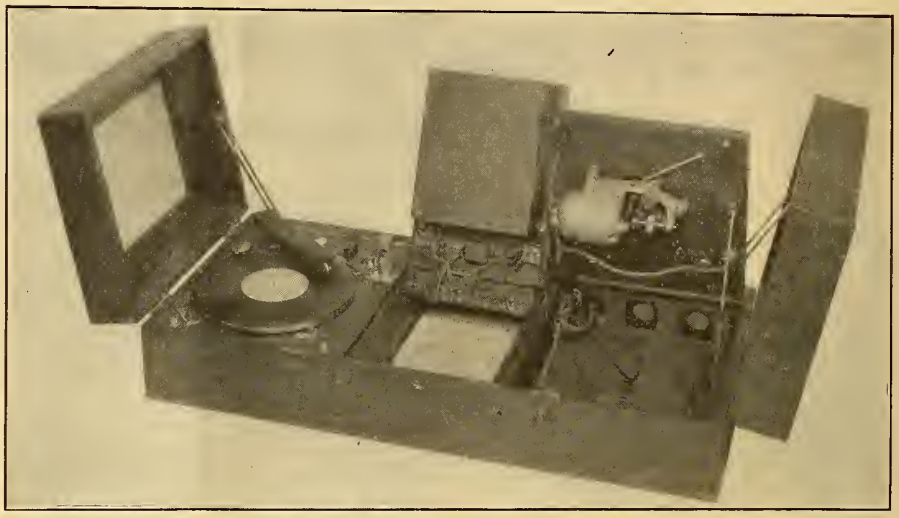
defect. The manufacturers have already inserted all the things necessary to do away with such things and give only clear reproduction.

Pick-up for Disc Types

This pick-up consists of a permanent magnet having an armature free to move between its pole pieces. This whole business is placed in a case filled with a special oil the purpose of which is to damp out any excessive and extraneous vibrations of the armature which, should they be allowed to go through the system, would cause distortion and bad quality.

While on this subject of film I want to call your attention to the necessity for keeping the film very clean and free from oil. Oil collects dust and dust makes noise. Scratches also make noise. There is a certain amount of inherent noise, called "ground noise," in the film. This is beyond your control and is due to the film base, developing, etc.

You may at some time hear a noise similar to an airplane engine purring. Upon examination you will probably find that it is caused by the sprocket holes showing in the light track or by the frame lines being printed in the sound track. Sometimes this may be corrected by adjusting the guide rollers to a side opposite where the noise comes from. However, the producers are now turning out good material, and I want you to, above all, see that the film is *always clean.*



W. E. Non-Synchronous Equipment



Late Type Amplifier

This lamp when lit must be so focused that its beams pass through a narrow slit in the optical system and then passed through an objective lens which is focused on the sound track, through which it passes and is projected on the photo-electric cell.

Focusing the Sound Lamp

To focus the lamp remove the sound gate and insert a piece of white card board in front of the opening of the photo-electric cell. Move the lamp forward or backward, up or down, by means of the various adjusting screws, until an intense clear oval spot is obtained.

The fader or volume control is usually located on the front wall between the two projectors. It consists of nothing more than a potentiometer of high resistance. When the handle and pointer is thrown on either the red or the white side the pick-up of either machine is thrown into circuit and the amount of current passed to the amplifiers is regulated. The various keys at the top left are for the purpose of cutting out either side of the fader (which may become inoperative) and inserting resistance enough to give a setting equivalent to a "9" setting.

They key at the right is for the purpose of putting a third machine in the amplifier circuit. When thrown on the red side the fader operates the 3rd projector on the red side, and vice versa.

The film transfer panel which is usually mounted above the fader is just what its name indicates, namely a method whereby it is possible to change the class of reproduction from either film to disc, or vice versa. It consists of a box containing three relays which are actuated by the 12 V-F battery and the pressing of either button actuates the proper relays and performs the operation indicated on the button pressed.

Daily readings with a hydrometer are necessary. It is a good plan to charge one set of batteries while the other set is in use. It is quite impossible to lay down any general rule as to how long each set should run, and the hydrometer is the only trustworthy check. Do not let any set fall below a 1,200 reading, and a 1270-1285 is a full reading. A sort of rule of thumb to follow is as follows:

Put in as much as you take out, plus 25%. For example, on the H batteries you have four horns and a monitor. Each horn consumes 1½ amps., and you use the system six hours:—therefore you will have taken out 7½ amperes. These 7½ amperes plus 25%, or approximately 10 ampere hours, must be put back, so your charging rate will have to be a multiple of amperes input by hours. For example: 4 amperes for 3 hours equals 12 ampere hours, plus 25% equals 15 ampere hours—this is what you will have to put back. Say, for example, that you can charge the batteries for five hours, then set your charging rate at 3 amperes: thus, 3 x 5 = 15 ampere hours. So, all you have to remember is that ampere hours equals actual hours multiplied by amperes.

The F Batteries: The Movietone amplifier takes ¼-amp., the exciting lamp 3.6, the 41-A amplifier ¼, the signal lamps ¼, so you will have a load of about 4.6 amps. for 6 hours, giving you 27 ampere hours; to this total add 25%, which brings it up to 33 ampere hours which must be put back.

I cannot impress upon you too strongly the necessity of keeping the battery tops clean. Any acid, water or dirt which may accumulate on the battery tops invites short circuit and noisy operation. The dirt in the air, mixing with the moisture, and settling on the tops of the batteries soon forms an electrical path which allows the current to leak away. About once a month the battery connections should be taken apart and cleaned, as it has been found that corrosion takes place between the bolted parts.

The Vacuum Tube

Vacuum tubes play so important a part in sound, that my suggestion to

(*Continued on page* 14)

*H*oliday *G*reetings

from the

*I*nternational *P*resident



THE craft has made tremendous progress within the past year, partly because of the new forces which have come to play such an important part in the motion picture industry, and partly because of the splendid foresight of your leaders in planning for the future and developing and maintaining the splendid morale of each and every Local Union.

Progress such as this would have been impossible were our craft unprepared to cope with these new forces which injected themselves into the industry with almost incredible swiftness, and which practically overnight taxed the strength of the craft. That the craft has shouldered these added responsibilities so well, and at times even exceeded the fondest expectations of their officers in particular and the industry in general, is a tribute to its ability, its loyalty, its unity and its worth.

To you men who have played so well the difficult parts assigned to you, and to your officers who have proved themselves leaders in every sense of the word, I extend the wishes of myself and of every officer of the Alliance that you may have a Merry Christmas and a Happy and Prosperous New Year.

WILLIAM F. CANAVAN,
International President

A Projectionist Goes to the Movies

AT last we see ourselves as others see us—only this time we are examined by one whom we cannot deceive by resorting to the little tricks which every now and then enable us to slide over a rough spot or two in the program. The accompanying article was entirely unsolicited and comes from an unknown source. It is printed verbatim.

It is apparent that the writer is a projectionist, and his reaction to sound picture programs probably represents the feelings of many projectionists. Beneath our unknown contributor's casual style and apparently harmless remarks are a few sharp sallies and several suggestions which are interesting and valuable.

MY wife and I determined that on the next night I was off we would go down to the theatre where they have just installed sound picture apparatus to "see and hear" what it was all about. We would be patrons. The "night off" duly arrived, and off we trekcd to the thcatre that blazoned forth its announcement that one might "see and hear" their favorite stars. Now, here is what we saw and heard: The marquee informed us that "The Patriot," with Emil Jannings, was playing, together with a strong supporting program. Sixty cents admitted us to this 3,000-seat theatre that boasted everything to make the perfect photoplay house.

As we entered the lobby door we heard a few notes of music, not very loud but strong enough for us to detect the "canned" effect. The house was well-filled and we were obliged to go to the seventh row to get seats. The feature was on as we entered and the music was very low and seemed to lose volume steadily. As the picture progressed the music became less loud and on the last reel was almost indistinct. I don't believe the people sitting past the center of the house heard it at all.

Poor Sound Effects

After a few minutes I noticed a changeover, which manifested itself through the medium of one title being almost one foot lower than its counterpart on machine No. 1, showing, of course, that the framing devices had not been properly lined up. The fact that No. 2 machine also had a dirty lens was also disclosed by a very foggy picture. These conditions continued all through the show, with every changeover through the nine or ten reels being distinctly noticeable through the drop in titles. So much for that.

Now for the sound effects. Whatever sound effects were used were several seconds out of synchronism. The feature was crowded with sub-titles and when the actors appeared to speak there was no sound. A scene showing horses galloping on soft and loose snow was accompanied by the sound of their hoofs as though they were galloping on a concrete road. A column of soldiers marching on the snow produced a clattering sound that would be applicable only to many men pounding on boards. The sound of several rifle shots did not come through until about five seconds after the screen showed the smoke of their discharge emit from them.

Boys, it was a Russian "drama," but it made a hit with me as straight comedy. The Czar and others of his entourage walking on a hardwood floor made no sound at all, and the banging of several large doors was done to complete silence; yet in a subsequent reel the creaking sound of a door being closed carefully was heard. Another reel had a close-up of a clock, its ticking being heard plainly; yet, a group of characters engaging in conversation near the clock made no sound at all.

Organ Preferred

Then again one heard the Czar shrieking in terror from a bad dream, but another character at his side attempting to soothe him made no sound at all. In a close-up of a large bell, the sound of the bell was heard several seconds before the hammer actually hit the bell. And so it went all through the show, even to a trailer with sound effects. Personally I prefer the good old organ, and I know there are a good many movie patrons who derive much pleasure from hearing their favorite organist play. To me, pictures without organ music is like breakfast without coffee.

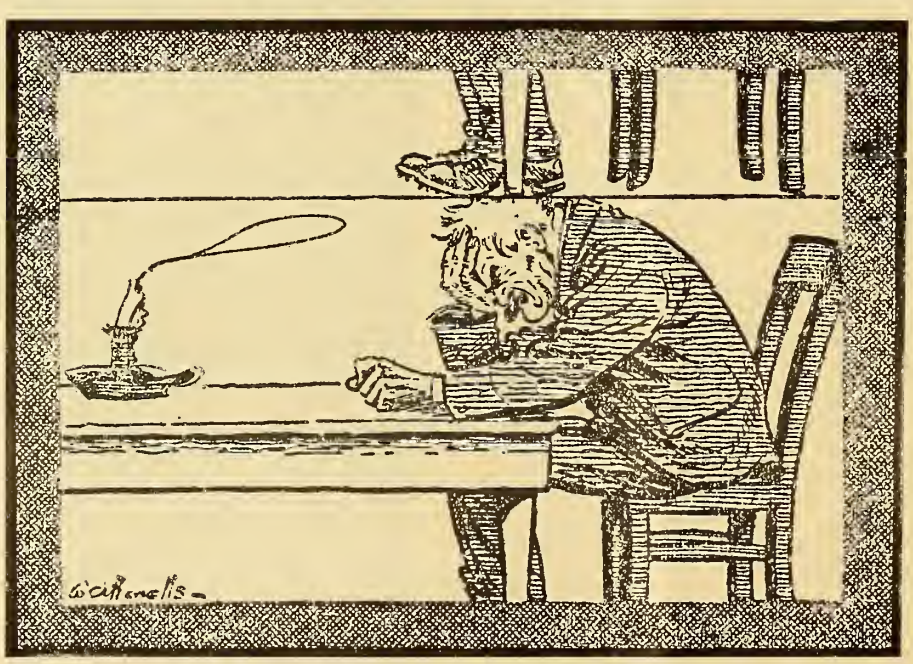
Well, our family agreed that the show was very poor. The claim might be made that sound pictures are as yet in their infancy and that much improvement will be effected within a short time, but it would seem that the proper thing to do would be to hold these systems in abeyance until such time as the apparatus is foolproof. Otherwise continued troubles must breed dissatisfaction among theatre patrons which might easily do much harm to show business.

But next Wednesday evening we are going to attend another "toney" theatre which has the reputation among projectionists of putting over sound pictures in A-1 style.

AS promised, the following Wednesday night found us on our way to another theatre where sound pictures are shown. Parting with a hard-earned projection dollar, we entered the house and found seats about 16 rows from the front. The lobby displays promised a good show, what with 4 acts of vaudeville, a Movietone feature, "Mother Knows Best"; the news and a comedy.

Both the picture and the sound effects were excellent. At times there was a slip indicating that speech and action were not in synchronism, but this probably was due to some defect other than the projection apparatus. The show progressed smoothly until a bad changeover quite spoiled the whole effect—a changeover reminiscent of the kind we use to make back in 1912 with a 30-ampere generator when we had to steal the arc from one machine to another, the picture appearing to fade out and then fade in again on the next reel, not forgetting all the pretty colors that go with it and with which most of us are familiar. It is quite probable that this condition is due not because of poor projection work but through the unwillingness of the management to make necessary im-

(*Continued on page* 30)



The Man—"What is it that presses on my brain?"

RCA's New Sound Projector

THE accompanying pictures of the new RCA propector are the first to be printed in any magazine. This new projector, about which much has been rumored but little known since its announcement in these columns, is known as the P-2, embodying many improvements which were suggested by tests of its immediate predecessor, the P-1.

This projector was especially designed for use with the RCA (Photophone) system of sound reproduction with motion pictures and will be installed as a matter of course with all Photophone equipment. A complete description of the Photophone apparatus and of its operation, along with details of this new projector, will be given in an early issue of this publication, probably the next.

The four principal types of RCA·Photophone equipment for theatres have the following type designations, and will serve audiences of the following number of persons in any average theatre or auditorium:

Type A: Up to 6,000 persons
Type B: Up to 3,000 persons
Type C: Up to 1,500 persons
Type D: Up to 750 persons

The above ratings are conservative and may be exceeded in some cases. The equipment is designed to give spectacular effects when such are called for, and it therefore has a considerable overload capacity.

The projector is of the highest grade. The sound reproducing head plays all existing types of synchronized sound films. The entire gear system of the projector runs quietly in a forced-feed oil bath, thereby insuring long life for the gears and quiet operation, together with freedom from the annoyances incident to frequent overhauling. The film is carefully shielded from oil or dust

Less Heat, Flicker

Through special arrangements of the optical system and position of the shutter, flickerless projection is obtained without overheating of the film. An important advantage of the RCA Photophone projector is that the heating of the film is considerably less than in most other projectors, thereby preventing buckling of the film, back of registration, and blurring of the image on the screen, and injury to the quality of the sound produced.

Every desirable engineering precaution and every feature yet designed to avoid any interruption of service have been incorporated in this machine. The lights which are used to illuminate the film sound track are provided in duplicate, if one burns out during a performance, the touch of a lever brings a second prefocused lamp into position and lights it automatically, thus preventing interruption of the performance.

2 Machines to Installation

The RCA Photophone projector is a thoroughly developed and specialized sound motion picture projector, designed and coordinated to give a service worthy of the finest theatres and to meet the desires of the most exacting managers. Two projectors are furnished as component parts of each Photophone projection installation.

The ordinary wiring of the arc, or incandescent lamp, of the motion picture projector, is identical with that used in any projector. Only the additional wiring incidental to the sound reproduction in the RCA Photophone system need be considered.

The wiring of the sound-reproducing circuit consists of a connection from the sound head of the projector to the initial amplifier in the projection booth, thence to the final amplifier, and thence to the loud speaker groups on the stage. The wiring can readily be arranged in cable form which in almost every instance can be run in existing theatres by a local electrician under the supervision of an RCA Photophone engineer.

A small amount of additional power and battery wiring and wires to the driving motor of the projector and its starter are required. All RCA Photophone equipment and wiring methods are of a character approved by the Underwriters' Laboratories.

Minimum of Adjustment

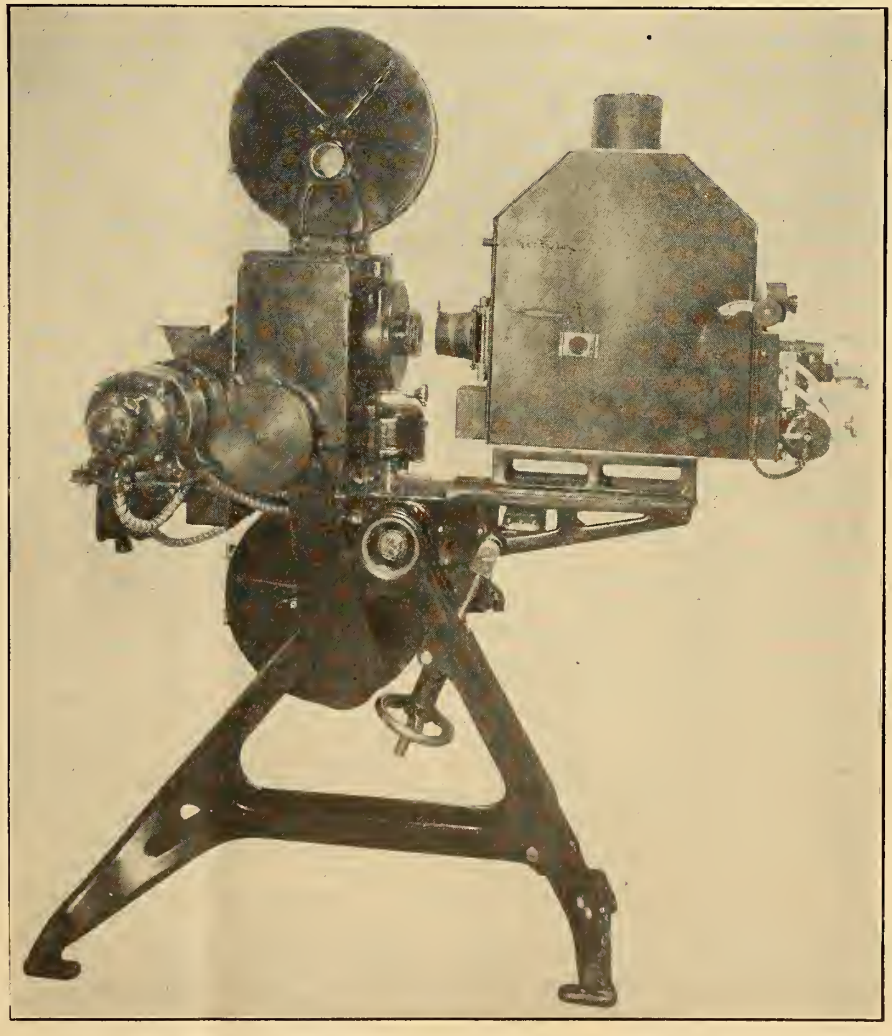
During the projection of films, an absolute minimum of adjustment is required. The operation, in fact, is almost exactly the same as that of an ordinary motion picture projector. A moderate and reasonable amount of supervision of the equipment to keep it in normally clean and efficient condition is all that is required of the projectionist. Change over from one projector to another at the end of a reel (when the point corresponding to change over is reached as indicated on the cue sheet) is accomplished by the mere turning of an accessible handle.

Standard Photophone equipment has been designed to operate on 115 volts direct current, and on 220 volts 3 phase alternating current.

Generator Set Supplied

In the case of Class "A" and "B" equipment a four unit motor generator set is supplied as standard equipment. The

(*Continued on page* 25)



Side view of RCA Projector, Model P-2, showing location of various important parts

As The EDITOR Sees IT

¶ *Projectionists' Authority*

IT was Abraham Lincoln who said that some people are born great, some achieve greatness while others have greatness thrust upon them. The art and science of good projection demands expert practictioners, and so it may be said that a projectionist comes into the craft with the mark of authority already upon him. I will use the word "authority" instead of "great" to convey the sense of this editorial. In the course of his work, if he shows real interest and an inquiring mind, the projectionist may be said to achieve authority, that is, win the respect and esteem of his theatre co-workers for his unsolicited and voluntary contributions to the success of the theatre.

Today, with the sound picture situation, the projectionist is having authority thrust upon him. The extent to which the projectionist assumes this authority will mark the measure of his immediate and future progress.

The industry accepted naturally the fact that the projectionist could and would handle sound devices expertly. He has done so brilliantly; and we have it on the authority of one of the best-known engineers connected with one of the biggest sound companies that the success of sound pictures was due in great part to the readiness of the projectionist in adapting himself to the equipment.

¶ *Your Judgment Essential*

BUT the industry must go a step further. After having accepted the fact of the projectionists' ability to handle sound, it must now go beyond that and *consult* the projectionist *on all matters pertaining to projection.* There has already been too much of this sort of thing:—Mr. Exhibitor buys some piece of projection room equipment without first consulting the projectionist and then suddenly shoves it into the projection room without so much as a "by-your-leave, sir."

We do not take the position that the projectionist must interest himself in matters of prices and discounts on projection room equipment. But we do take the stand that since all responsibility for perfect projection rests with the projectionist, he be the man first consulted on all scheduled purchases of equipment, no matter what arguments the salesman of the supply house whispers in honeyed accents into the exhibitor's ear.

How can the exhibitor expect the projectionist to be responsible for perfect projection if he does not first consult the projectionist as to the equipment he can work best with, can get most out of, likes best to handle, etc.? That is one side of the story. The other is that many projectionists are still indifferent to exercising their authority.

¶ *One Judgment of You*

THE exhibitor today is more or less indifferent to anything in his theatre except the dollars that tinkle across the box-office till. We do not mean the large circuits where able chiefs are responsible for projection, but the bulk of the country's houses. Here the projectionist *must insist* that his theatre manager *recognize him as the chief arbiter of matters about projection.* Force yourself into recognition.

I have in mind the case of one company that is marketing a sound picture device which has gone on record as not caring a damn about the projectionist. One of its representatives recently made a tour of many cities to sell his device and when he returned I asked him if he had also visited the projectionists in the theatres he visited. What he thinks of the value of the projectionist is in the first sentence of this paragraph.

This sounds incredible, but it is a fact. And this same thought still exists in the minds of many others who should know better. But not until the projectionist asserts himself so that his voice is heard in a swelling volume of authority will this attitude change.

The change must come from within the craft, outward. Exhibitors are ready to listen as soon as the projectionist is willing to assert himself. We must all shed the cloak of indifference and step forward in the bright raiment of our natural rights. Authority is thrust upon the projectionist daily in being given more complicated equipment to work with; and he must seize with it the natural prerogative of having a voice in the decision on new equipment, additions to equipment, and replacements.

¶ *Concerted Action Necessary*

NOT wishing to be a calamity howler, shouting at the top of our voice without a definite program, we hereby offer one by which the projectionist can assume this authority. It is surprisingly simple. When you have finished reading this, seek out your manager at the earliest possible moment. If you are giving your best in the projection room with the equipment you have, you have nothing to fear. You are his colleague in the success of his business and in the success of your livelihood. In establishing a mutual understanding for mutual benefits you are simply cooperating to establish the permanency of the institution which gives you both your livelihoods.

Tell him what new equipment you need. Ask him if he plans on having a sound picture installation. Consult with him about the best particular equipment for his needs, the particular equipment you are sold on. Ask him what equipment he has in mind. Talk it over together. Do not hesitate to stack your honest opinions against his, if you think he is buying price and not quality. He will appreciate this interest.

Hundreds of projectionists are doing this every day. We wish that many thousands would do it—and start doing it now.

Assert your authority, your responsibility. Let us all work together to do away with the intolerable and illogical condition which permits anyone manufacturing anything for your use to say he *doesn't give a damn about you!*

Speed Control for Sound Systems

By HUGH M. STOLLER
Bell Telephone Laboratories

SYNCHRONIZATION between sound record and film is required for all types of sound-pictures. In the Western Electric System it is secured by electrical methods for the recording apparatus and, for the reproducer, by mechanically coupling the picture projection machine and the sound record. With satisfactory synchronization thus secured, there still remains, however, the problem of speed control. Musical pitch varies directly with frequency or rate of vibration. The faster the record is rotated, the higher the pitch of the sound given out. In order, therefore, that the reproduced music may be of the same pitch as that recorded, the record must run at an assigned speed, and to keep the pitch from varying during the playing of the record, this speed must be prevented from changing. To attain these ends, the speed of the driving motor must be accurately controlled.

In determining how nearly constant this should be held, the criterion is the smallest pitch change that is noticeable, and it has been found that abrupt variations are more readily perceived than slow ones. A good musical ear will detect sudden changes in pitch produced by a change in speed of only one-half of one per cent. To make sure, therefore, that a discernible change in pitch never arises, speed regulation better than one-half of one per cent is required at all times. As further allowances seemed desirable to provide a suitable factor of safety, a regulation of two-tenths of one per cent was agreed upon.

Completely New Design

A survey showed that no commercial governing mechanism was available which would meet the requirements. The most suitable was probably the governor used with ordinary phonographs. This governor applies friction as the speed increases, and it becomes increasingly difficult, because of maintenance difficulties, to design a satisfactory governor of this type for the larger motor required to drive both the projecting machine and turntable. A completely new design seemed the only satisfactory course.

The nature of the problem and the difficulties to be overcome are perhaps most readily brought out by considering a simple fly-ball governor controlling the speed of a steam engine, shown in Figure 1. Rotation tends to make the balls move outward due to centrifugal force. As they move out, however, they pull up a sliding collar and this action, through a system of levers, closes the steam valve supplying the engine, or in some other manner decreases the supply of steam, and the engine slows down. The tendency of the balls to fly outward is opposed by their weight so that there is a definite equilibrium position for each speed.

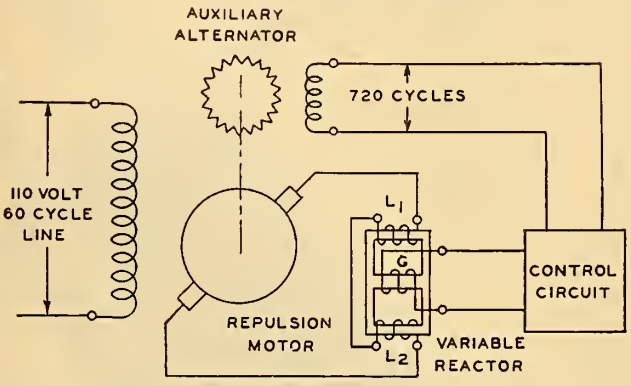


Fig. 3—Torque control for the driving motor is obtained by a three-legged inductance coil, the impedance of which is changed by direct current flowing around the middle leg.

Load Considerations

As a result of this the engine will run at a given speed for only one load. A load greater than this will require a wider valve opening so as to admit more steam, and this in turn will require a lower position of the fly-balls to allow it. This necessary drop in speed to allow a wider valve opening may be reduced, however, by moving the position of the pivoting point of the lever to the left. This changes the lever ratio so that smaller and smaller movements of the sliding collar will produce greater and greater valve openings.

Inherently, however, some speed change must be permitted in order that the valve may be moved to accommodate the new load. To enable the engine to run at one speed regardless of the load requires an additional mechanism that will admit enough more steam to the engine to carry the increased load at the desired speed.

When, however, the sensitivity of the governor is made too great by moving the lever pivot too far to the left, or when the additional mechanism is added to make the engine always run at the same speed, an unstable condition is brought about. Under these conditions, the engine, at each action of the governor, tends to over-shoot its mark, either not attaining equilibrium speed at all or reaching it only after several oscillations. This instability may be overcome by adding a dashpot or some similar contrivance to the governor which, allowing an initial rapid adjustment, will later introduce a slower compensating force that prevents oscillations of speed.

The same governing principles apply whatever may be the type of governing apparatus. A change in speed must be able to cause some force to act on the prime mover tending to counteract this

(*Continued on page 26*)

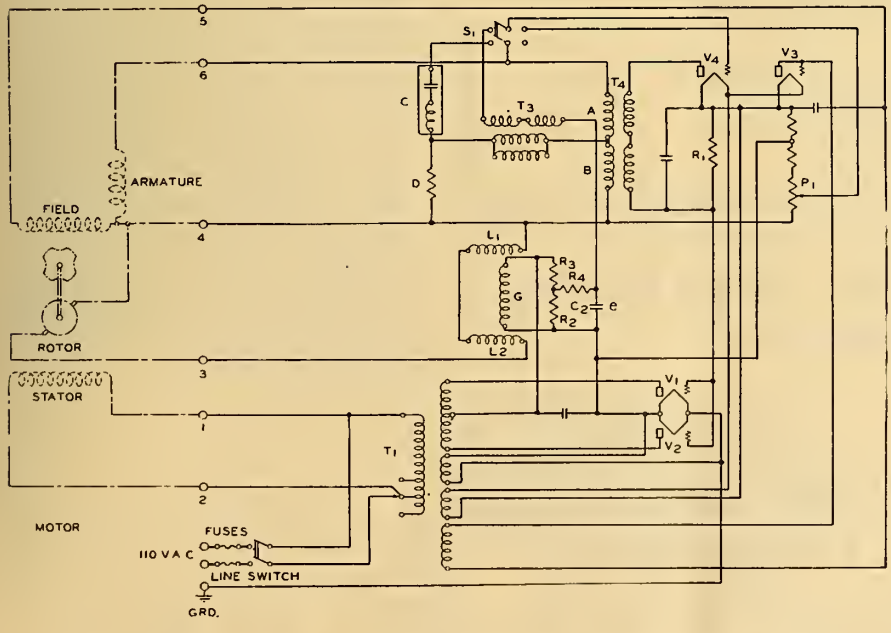


Fig. 4—Complete diagram of the governing circuit showing the three-legged reactance coil in the center. Switch S_1 is normally thrown to the left.

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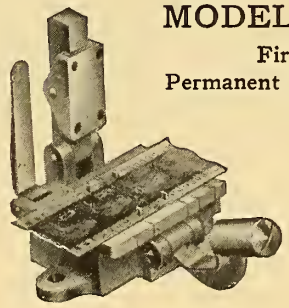
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W. E. System Operation and Maintenance

(*Continued from page* 8)

you is to master this principle thoroughly.

The vacuum tube consists of a glass bulb having sealed inside of it three metallic elements known as the filament, plate and grid. The air has been exhausted from these bulbs. When the filament is heated and charged negatively, there will be a flow of current toward the plate which has been charged positively. This flow is even; and if we interpose something



Rudolph Miehling

of an electrical conducting nature, called the grid, between this heated filament and the plate, any change in potential of this grid will change the rate of flow in the plate current.

Now, when a current of varying intensity, such as that made by sound or music, is impressed properly on the grid, this grid has the faculty of interrupting the flow between the heated element and the plate, and amplifying same.

Amplification

The panel itself consists of three amplifiers known as the 41-A, 42-A and 43-A. In all amplifiers a means of either inductive, resistance, impedence, transformer coupling, or a combination of these, is used to amplify the impressed signals.

All amplifiers function about as follows: The signal is put through some sort of a winding or windings which have a set-up feature in their make-up, and from this the amplified signals are impressed on the grid of a vacuum tube whose filament has been properly heated and whose plate is positively charged. This signal on the grid changes the characteristics of flow in the plate circuit as previously explained. This operation is repeated until the proper amount of amplification is had. The various condensers, resistances and other apparatus put in the circuits are merely for the purpose of cutting out or by-passing undesirable features.

The 41-A amplifier is a three-stage amplifier employing tubes whose filaments are wired in series and supplied with current for the F battery. The plate current is supplied by rectified A. C. from the 42-A panel. The current consumed by the tubes should be 250 mils. The plate

current is 1.5 mils.—never less than 1.3 mils.

The 42-A is a push-pull. The two 2050 tubes at the left are amplifiers, and the two at the right are rectifiers. Care should be taken not to confuse these tubes.

The 43-A is also push-pull and has 211E tubes situated in the same relation as the 42-A. Between the first and second stages of the 41-A there is placed a potentiometer for the purpose of regulating the gain which is delivered to the rest of the amplifiers.

Output Control Panel

After the impressed impulses have been amplified they are delivered to the output control panel. This is the panel that has the various horn switches on it. This panel is merely a step-down transformer with intermediate taps. These taps and an outside one are multiplied to the various dial switches which control the individual horns and the monitor. Be sure that the contact arm rests on one point only, because if it does not, poor quality results.

To obtain satisfactory quality reproduction, certain settings are given you. These settings correspond to certain electrical characteristics and must be as near unity as possible, and it would be well to keep these as given.

The receiver consists of a unit and an exponential horn of two types, one to take care of the higher frequencies or higher tones, and one to take care of the lower frequencies or lower tones—a combination of both is that which gives the quality.

The unit is what is known as the dynamo type, consisting of an electrical magnet whose field is separately excited and a coil of wire put there to move between these pole pieces. The amplified speech current is sent through this coil of wire which in turn is connected to a cone, or



702—A Control Cabinet (W. E. Fader) Front View

diaphragm, and, as any changes occur in the speech current, the diaphragm is vibrated accordingly and sound is produced. This is about the reverse of what happens to the reproducer.

Motor Control Box

The motor control box and its associated apparatus consisting of a motor generator, various gear boxes and a turntable,

Marvelous, New, Changing, Colorful

SCENIC EFFECTS

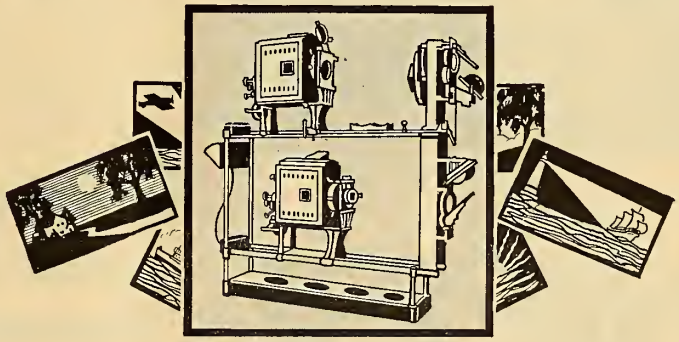
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are used for the express purpose of keeping the speed of the projector at *exactly* 90 feet per minute. No other method has yet been devised which does this work so well.

The motor generator consists of a motor to drive the mechanism at one end and an A. C. generator at the other end. This generator produces alternating current at the frequency of 720 cycles at 1200 r.p.m. If the speed is less, the frequency is less, and vice versa. The motor generator depends for its operation on what is called a tuned circuit. By this is meant a circuit which will permit alternating current of a certain frequency to pass readily but which offers a high resistance to alternating currents of other frequencies.

When the motor is started the frequency will tend to build up to 720 cycles as the motor builds up toward its speed of 1200 r.p.m. When this point is reached the frequency is 720 cycles, and the current passes through the tuned circuit and keeps the field of the motor steady. If it falls below, the field is weakened and the motor speeds up; if too fast, the field is strengthened and the motor slows down. This is about the simplest way of explaining the action.

Routine of Operation

After the system is turned on, tested, horns set, machine properly threaded, reels and records checked, each projectionist should stand at his appointed place. The man running No. 1 machine starts his motor and when up to speed opens dowser. The fader is then brought up to a predetermined point when the cue sanctions. This is very important. A failure to do this causes a very bad scratching noise in the auditorium.

At the proper time near the end of the reel projectionist No. 1 will notify projectionist No. 2 to light the arc on the incoming machine and stand by. At the proper cue projectionist No. 2 will start his motor and make the changeover. Projectionist No. 1 will stand by and change fader from outgoing machine to incoming machine at the proper cue. Projectionist No. 1 will also be alert in the event that the changeover does not function, so that he can manually make up any deficiencies.

Importance of Fader

In the event of any trouble arising with the equipment while the show is running, *bring fader to zero immediately* and then stop motor and endeavor to rectify trouble. If the music or dialogue should be out of synchronism, bring fader to zero, douse light and stop meter. On short subjects proceed with the next reel; on features, re-thread and start over.

On features having music score only with no direct cues the reel can be run through. Should a break occur above the intermittent, bring fader to zero and re-thread, starting again at starting marks. Should the break occur below the intermittent, bring the fader to zero, re-thread and start again. While you are doing this, care should be taken not to take the needle from the record. In patching film be sure to put in as many frames as are cut out.

Use only black leader, and *report all patches and insertions.*

Watch all cues carefully by sight and sound. If any non-synchronization takes place and it is a consistent error, a report should be made immediately. All records should be stored in a cool place and laid flat so as to prevent warping. Should a motor control go bad, turn switch to *var* and regulate speed by hand, keeping speed as near 90 as possible. Do this until such time as the trouble is eliminated.

Preliminary Steps

In threading see that the cut-off blade is in the up position, for if it is not, the picture will be out of frame and out of synchronism. Be sure that the starting mark of the film is in frame, and the record properly placed so that the needle is on the starting mark. Check all loops, idlers and sprockets. See that the needle is properly tracking and use a new needle for each record. A cleaner is provided to clean each record before playing. After the machine is threaded and the record is properly set, see that the proper number of turns are run down. These turns will be indicated on the cue sheet.

Each projectionist should check-up on the other, in order that a continuous show be run. The machines and mechanism should be oiled and checked daily, and if any irregularities are found they should be reported and repaired immediately. Do not wait until after a hold-up happens. This is *strictly* up to each projectionist. Do not place any tools or other material on the machine or bases. They are liable to fall on the disc.

Examine the records for holes and scratches and if any are found, discard the records. Examine the needles and do not use any with dull points.

Various Trouble Procedures

Whenever trouble occurs, *bring fader to zero.* Use the emergency equipment, if you have one installed, and endeavor to locate and remedy the difficulty by following the instructions given.

Film breakage has been taken up under the routine of operation.

If quality goes bad or becomes noisy, a bad needle may be the cause. At the proper time examine. Then, again, a receiver may have gone bad. To find out if this is so turn all horns to *Off* position on control panel, then turn the horns on one at a time. If a defective horn is found, keep it off and replace when opportunity permits.

To replace a receiver, take off the wires on the four terminals and, with the wrench provided, loosen nut and lift off receiver. Replace it by one of the spares and be sure and connect each wire to the same terminal on the new receiver as it was connected in the old one.

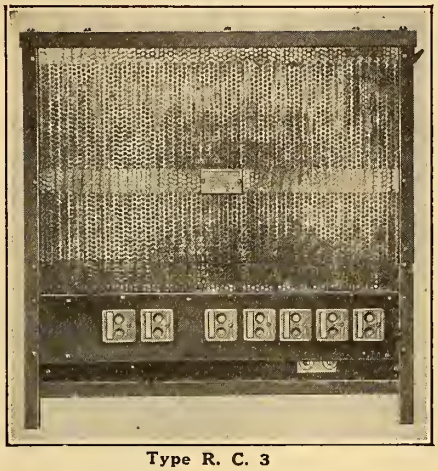
If receivers are O. K. and noise still persists, the next step will be to change reproducer or reproducers. To do this unscrew the thumb screw holding the reproducer and place on the table. Disconnect the wires from the connector and remove, replacing with the spare, which

(*Continued on page* 22)

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A Great Tribute To Projectionists

By MR. HARRY M. WARNER



HARRY M. WARNER

(Mr. Warner's tribute to the craft was delivered, via Vitaphone, on the occasion of a Benefit Performance given recently by Local 306 members. The record of Mr. Warner's remarks was made especially for this occasion at the Warner West Coast studios. His address in full appears below. Mr. Warner was quick to seize upon the opportunity thus presented him to convey to projectionists everywhere his company's appreciation for the splendid cooperation of the craft and to express his opinion of the industry's attitude on the importance of the projectionist's work in popularizing sound pictures. Coming as it did on the eve of a New Year, Mr. Warner's statement may properly be construed as Warner Brothers' New Year greetings to the craft.)

It is a great pleasure and honor to be able to talk to you this evening, as the bond of friendship between the members of your Society and Warner Bros. is a strong one and one of long standing, chiefly because my brother, Sam, was a member of your organization up to the day that he was taken from us. He started operating a picture machine just twenty-five years ago in Youngstown, Ohio, before you were organized. He shared your victories and was deeply interested in the human and technical problems of your profession. Therefore my brothers and I feel ourselves very close to you, almost co-workers and co-partners.

Warner Brothers really obtained their start in the motion picture industry by way of the projection room, and I am sure that my brother's name and spirit will live on as long as there will be machines running.

I realize what responsible and important positions you men play in the picture business.

The difference between good and poor projection often makes the difference between a successful picture and a failure. All the money and labor and sleepless nights we put into the production and presentation of a picture can easily be wasted until we get the expert knowledge and skill of you boys. Your cooperation is important to us.

If there ever was an industry dependent on keen play, it is the motion picture industry that gives us all our bread and butter. We are in a business where the word "we" plays an important part, and not the word "I." For that reason, and many others, all of us who have been lucky enough to prosper in the motion picture industry, are deeply grateful to your organization.

From the very beginning you kept the standards of your craft up to a high level. You promoted a spirit of fair dealing, dependability and honor among your members. You encouraged the virtues that have enabled the motion picture industry to take its place among the giants of modern civilization.

And now with the coming of VITAPHONE and sound pictures, there are new problems that confront all of us. The task is worthy of our best efforts. I am sure that through the Vitaphone a universal language will come forth; that man will come to man and not just have a few talk for us. And, by this means, peace will be established in this wonderful world.

Those of us who are engaged in the production of sound pictures are deeply grateful to you boys who by your ability, your industry and your steadfast adherence to the high ideals which guide every worthwhile craft—in particular your own—have aided in opening up new vistas of achievement for the motion picture industry.

MR. HARRY M. WARNER is the President of Warner Brothers, Inc., now the largest single factor in the motion picture industry. Through their control of Vitaphone and vast producing and distributing facilities — including First National Pictures Corp.—together with their large theatre holdings, they are today the dominating factor in motion pictures.

Therefore, it is of tremendous significance to the craft that its worth and power be so openly declared by one so important.

The men in the industry who count know the value of projectionists without question. They realize that sound pictures have been made possible only by the expert cooperation of projectionists. This is freely admitted everywhere today, and it is now confirmed by one of the leaders of the industry.

The Editor

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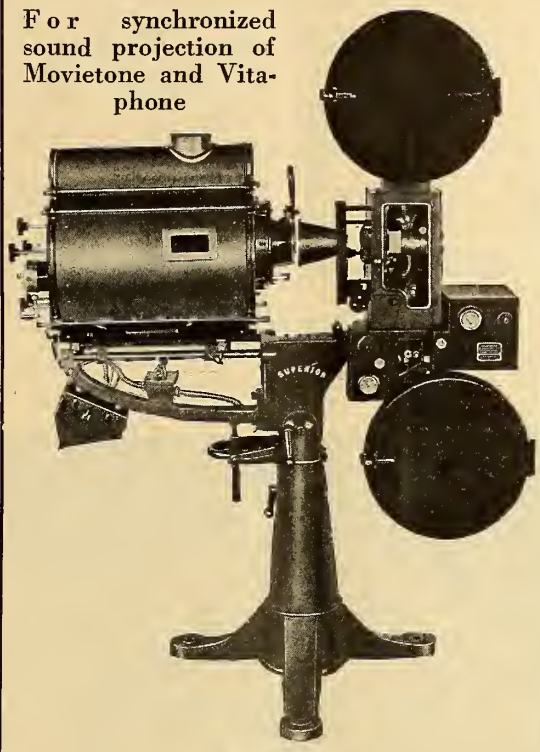
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Among the Local Unions

NOT having seen any news of the various Locals throughout the United States and Canada in your columns lately, I would like to ask "Where are all the writers who were going to do such wonderful things for their magazine, for themselves and for the other Locals by contributing regularly to your columns." You were kind enough to set aside a section of the paper to encourage just such exchange of news and views, but the answer of how well your efforts were appreciated is evident from the gradual disintegration of that department and the complete silence of the various Locals.

Is everybody throughout the Alliance standing still; are there no new developments, no new doings the benefit of which might be passed on to the other boys? For a bunch of fellows who are considered "up and at 'em" all the while they are cutting a sorry figure in taking advantage of their own paper to get together. Some on boys, step out and *prove* you are not dead!

Form Projection Society

Here in Toronto we have been moving pretty good.

In September the first sound picture show was given in this city, and the program attracted capacity business. Early in November the second installation was made in a theatre which opened with a midnight show. This particular performance played to 3,200 people, with as many more being turned away. An increased projection staff put over the show in faultless manner.

Some of us here thought it advisable to form a projection society for the discussion of the different phases of projection. The boys have taken a keen interest in the progress of the society.

Detroit, Mich.

Herewith is presented the likenesses of the Detroit Local 199 baseball team, champions of the Detroit Theatrical Baseball League for 1928. Somewhat surprising is the fact that with the baseball season having ended more than two months ago, an eager craft was forced to wait with palpitating hearts all this while for a sight of their brother champions.

H. S. Morton, impresario of things baseball in Local 199, explains this long delay very unsatisfactorily by advancing some such excuse as the fact that his team had to gradually strengthen their eyesight before facing the unnatural light of the sun at high noon. Not wishing to embarrass Mr. Morton, we shall accept his explanation.

It seems, however, that the glare of the sun did not affect the playing abiilty of his team, for they galloped through the season with the loss of only two games, and wound up the season by taking two out of three from their closest competitors, United Artists, by scores of 3-4, 9-4, and 3-2, the last game being what is commonly referred to as a "whizz."

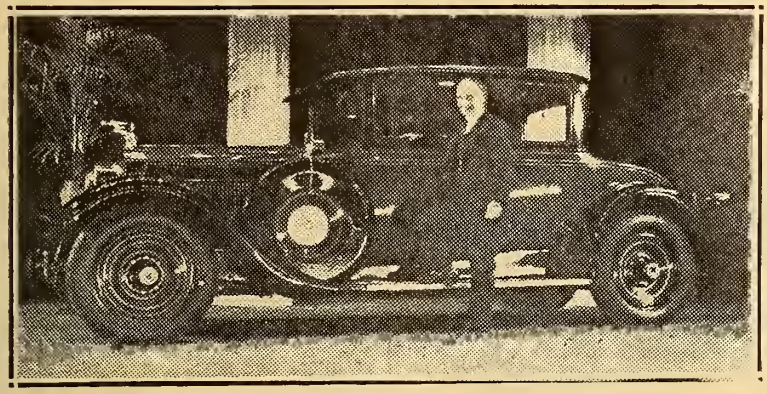
Mr. Morton advances the idea of a I. A. T. S. E. League comprising seven or eight clubs within a not too wide area, with the expenses of the clubs to be paid by the Locals interested. Anyone interested in this proposal should communicate with Mr. Morton, c/o Local 199, 810 Hoffman Building, Detroit, Mich.

Westchester County, N. Y.

Well, here we are again with a few items which may be of interest to the boys. Local 650 has renewed block sub-



The Champion Local 199 baseball team. Back row, standing: Roy Light, Ross Campbell, C. Williams, Gus Wetzel, Lee Sharp, Frank Sullivan, Lawrence Loy, Gilbert Light. Second row, seated: Wilbur Jose, Francis Light, Walter Geyer, Joe Sullivan, Vivan Aumock. Seated directly behind the cup is H. M. Morton, team manager.



President Shaughnessy of Local 650 appraising the Packard coupe, the gift of his fellow Local Union Members.

scription for all of its members to THE MOTION PICTURE PROJECTIONIST. We feel that this is the least we can do in return for the benefits we have received from it.

We have opened offices and a clubroom on North 5th Avenue, Mount Vernon (just a short distance from the train), and we wish to take this opportunity to invite any I. A. member to drop in on us whenever they may be in this vicinity. We hope the boys will take advantage of this invitation; the more visitors we have the more we shall like it.

President Shaughnessy Honored

In appreciation of one they hold in high esteem, the entire membership of Local 650 assembled in Proctor's Theatre (Mount Vernon), on November 22nd, to pay honor to their President, James J. Shaughnessy.

Surrounded by members of his Local, County officials and many friends, Mr. Shaughnessy was paid tribute after tribute. Mr. Joe Downing of Mt. Vernon acted as toastmaster.

Among the speakers of the evening were Judge Ruskin of New Rochelle, Irving Weiss, Yonkers; Joe Stern, Proctor's New Rochelle Theatre; Tony Guido, Portchester; Richard Edwards, Fred Thome and Arthur Martens, of Local 650; Joe Monaco, B. A. for Local 366 (Stagehands); Joe Chambers, Local 366; and Nathan Storch.

The theatre was lighted by beautiful effects. The climax of the evening came when the house was blacked-out, a spot thrown on the stage, the curtains parted—and there, resplendent in its shining newness stood a Packard coupe, the gift of the members of Local 650 to their President and a regular fellow.

President Shaughnessy, visibly stirred and very much embarrassed. managed to stumble through his thanks to the members for their fine gift and expressed the conviction that Local 650 had only just begun to progress and that the next several years will see a marvelous advance in all respects.

The committee in charge of the evening was George Alloy, Richard Hayes, Richard Edwards, Tony Guido, and Ira Pye.

900 E. R. P. I. Installations; Forecast Much Simpler Sets

MORE than 900 theatres have been equipped with sound picture equipment by Electrical Research Products Co. and by January 1st this number will be increased several hundred more, according to a statement issued recently by J. E. Otterson, President of E. R. P. I.

"Our engineers are continually working on the problem of reducing the size and simplifying our standard equipment without sacrificing its quality," he said, "and while I am no prophet, I fancy that when the solution comes it will be found to be well ahead of those who are newer to the problem."

Commenting on interchangeability, Otterson said:

"The Western Electric system of recording and reproducing sound represents seven years of laboratory development. The fact that it was the first commercially successful system ever developed quite naturally made us jealous of the results which, in conjunction with our licensee producers, we have secured; and in the contracts which we entered into for the use of our equipment in theatres we sought to protect the standard of quality in sound pictures which we had established.

"Before our system was put on the market there had been many unsuccessful attempts to produce talking pictures, and all had been doomed to failure. Since our system came out there have been a lot more offered for sale. We could not prejudge their quality and, without the opportunity to examine their mechanism, we could not judge whether the makers had infringed any of the patents which we took out to protect our own designs. But it is significant, I think, that the chief argument of these competitive devices which are now advertised is that they are interchangeable with Western Electric."

Hertner Company Moves to New Quarters

The increasing popularity of Hertner Transverters, product of the Hertner Electric Co. of Cleveland, Ohio, has necessitated the taking of new and larger quarters for the manufacture of Hertner equipment. A view of the new Hertner plant appears below.

John A. Hertner, President of the Hertner Electric Co., feels that the new factory will enable his company to turn out an improved product at less cost.

"Our new location is ideal in every way," said Mr. Hertner. "There are five acres room for future expansion. Direct shipping connections also is an added advantage. As a result of this move it has been possible to make many economies, adding materially to the efficiency of operation.

"Each machine in the new plant is so positioned as to be flooded with daylight, permitting ideal conditions and insuring absolute accuracy."

During the past year the sales of Hertner Transverters increased materially over last year, and Mr. Hertner is confident that next year will be the banner year for his product.



The new plant of the Hertner Electric Co. in Cleveland, Ohio.

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Keep Abreast of New Developments in Your Craft

W. E. System Operation

(*Continued from page* 17)

has been previously tested, and proceed. If trouble still persists, cut out fader as follows:

Throw the switch key, located in the upper left-hand corner of the fader, to red or to white, depending on which side you are operating. Turn gain control on amplifier to zero and regulate your volume by bringing gain control to proper level. If the trouble still persists, a regular check of the whole system must be made, i. e., filament current reading, plate current readings, and horn supply voltage readings.

If the system goes dead, see if all your filaments are lit and normal. See also if the plate currents are normal. Try horn excitation currents, and if all these are found to be O. K., take head phones and by a process of elimination locate the fault. Try head phones across the terminals of the reproducer. If music is heard, repeat this operation at the input and at the output of each amplifier until you finally come to the 200A panel. By doing these operations slowly and deliberately the trouble will be located. Once the trouble is found, remedy it if you can; if you cannot, call the service man.

If upon examination it is found that the filaments of any of the tubes are not lit, a fuse may be blown or the filament itself ruptured. The fuse for the filament is located in the charging panel. Both of these should be examined and if found O. K., insert new tubes.

If all the tubes show low plate current, the source of plate voltage is likely to be low. If only one of the tubes shows low, it is likely making poor contact. If you notice that the plate current fluctuates and the system is in operation, it is an indication that the system is overloaded. This condition makes for poor quality, and the overloading should be removed. Defective tubes also make noisy, scratchy or singing noises.

Summary of Troubles

If motor does not start:
- Line switch may be open.
- Fuses may be blown.
- Tubes may be bad.

If reproducer consistently jumps or does not track:
- Arm may be dragging.
- Arm may not have slope.

Excessive plate current:
- Poor contact.
- Clean tube contacts.

No sound from horns:
- Fuses blown.
- Line open.
- Line shorted.
- Bad receiver.
- One tube out on amplifier.
- Bad reproducers.

Noisy or poor quality:
- Bad receiver.
- Bad reproducer.
- Bad rectifier tube.
- Bad amplifier tube.
- Storage batteries dirty.
- Bad grid batteries.
- Poor ground.
- Loose connection.

New Cell Design

By Samuel Wein

AS has been explained previously, the photo-electric effect was discovered in the latter part of the last century, and since that time very little progress has been made in cell construction. This is primarily due to the fact that knowledge of the effect was confined but to a few workers in the electro-technical arts.

Were it not for the fact that the three-element audion became an important device with investigators, the photo-electric effect would still be buried among scientific phenomena and the sound motion picture still the dream of some inventor.

The number of different types of photo-electric cells commonly known is diversified, these designs being mainly confined

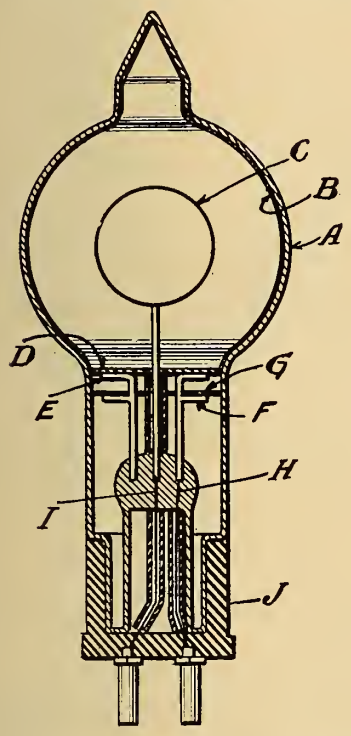


Fig. 1—Diagrammatic outline of cell

to shapes of the bulbs in which the experimenter was interested for his own particular desires. Recently, Messrs. F. Alexander and J. P. Gibson of the Radio Electrical Works, in New York City, have placed at the disposal of those interested in photo-electric cells a very interesting cell construction which is adaptable for sound motion pictures and kindred sciences. This cell design is shown in Figure 1.

Construction Process

Referring to the diagram on the inside of the glass bulb, A, is deposited a film of metallic magnesium, B. This is accomplished by heating the nickel plate, D, by means of high frequency current, which has a tendency to heat metals in its path by means of "eddy currents." The metallic magnesium is spot welded to the

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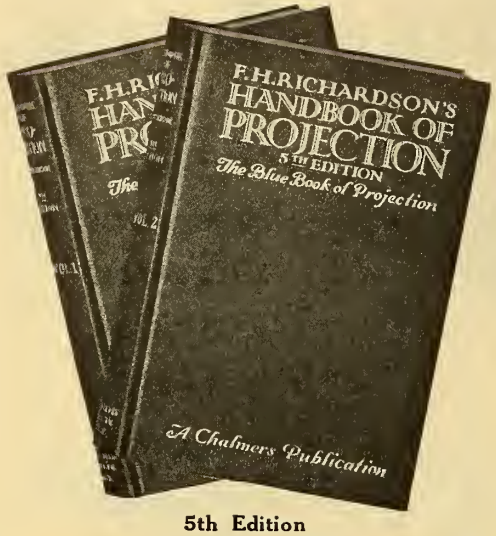
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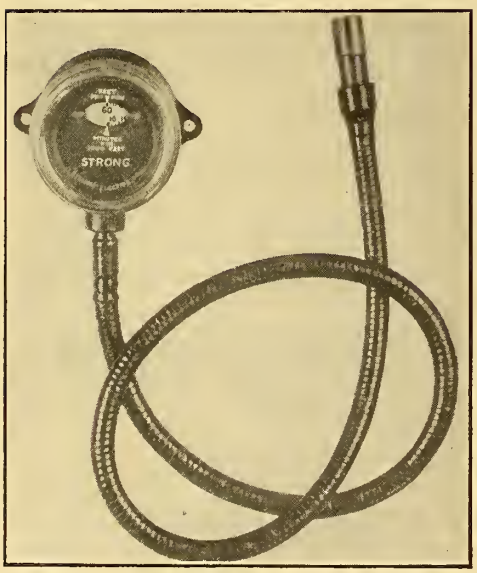
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nickel plate, D, and when this becomes sufficiently hot the magnesium "explodes" and distills on the inside of the glass bulb, which is indicated as a film on the diagram at B. This film of metallic magnesium serves as a means of electrical contact and as a medium to hold the metallic potassium (the active alkali metal).

The nickel plate, D, serves at the same time as a means to make electrical contact with the deposited film of magnesium at B.

The collector is shown at C and consists of a molybdenium grid in the form of a circle, as shown. This collector is seen to be electrically connected to one of the pins in the radio tube base at J. The film of metallic magnesium is electrically connected to the other terminal of the radio tube base. The other two terminals in the base (not shown in the drawings), serve as dummies and supports for the base.

Underneath the nickel plate is fixed a mica plate, G. This is intended to serve as a means of preventing the active metal from flowing down onto the leads and thus short-circuiting the cell; it also serves to prevent current leakages.

In actual practice, after the cell has been highly evacuated, the active metal is triple distilled into the bulb and onto the metallic magnesium film; and this latter deposit of potassium is next converted into the corresponding hydride (the sensitizing means), the free gases disposed of by means of further evacuation, and an inert gas—such as pure neon—is admitted at a low pressure. The bulb is then sealed off and allowed to "age" for more than a month before it is sold.

This type of photo-electric cell is known commercially as the "KH" tube. It is being used commercially and is particularly suited for second picture work.

Sound Hits Hades

The Hollywood citizen had just arrived in Hades. "Where can I find a picture show?" he demanded of a native.

"The Brimstone Theatre is just over there behind the Asbestos Works," grinned the native.

The H. C. bought a ticket and sat down to enjoy himself. There was an orchestra, an organ, a jazz band and a lot of canned vaudeville. The film entitled, "Pandemonium," was full of spoken subtitles and sound effects but there were no pictures on it. The H. C. grew restive. After a while he called an usher.

"Are you tryin' to kid us," he asked with acerbity.

"Whaddyamean kid you?" countered the usher.

"They ain't no pictures on this here film," sobbed the H. C.

"Pictures? Whaddye expect for $1.65," yelped the usher.

"Ya mean to say ya got nothin' but sound here?" wailed the H. C.

"Sure. We strive to be up-to-date," smiled the usher with great complacency.

And as the H. C. stumbled out the little devil in the box office thought she heard him mumble: "This IS HELL."

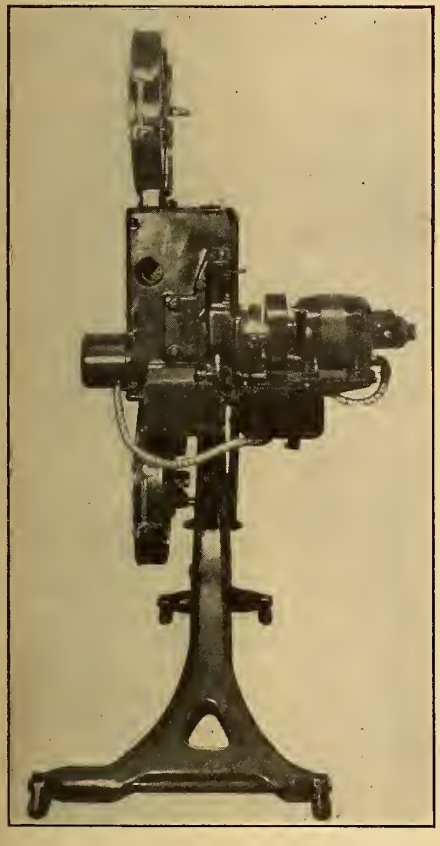
RCA Sound Projector

(*Continued from page* 11)

motor generator can be mounted either in the basement or in some part of the building where any noise made by it will not be heard in the auditorium and connected to the projection system by means of cables run through conduits.

The motor generators referred to are for the purpose of furnishing voltage for the large tubes in the amplifier section of the sound projection equipment and are not to be confused with the power supply for the arc for projecting the picture part of the film.

As outlined previously, the light chamber and the lens now in use in any motion picture theatre are retained in service and merely transferred to the new projectors which are furnished as a part of Photophone equipment.

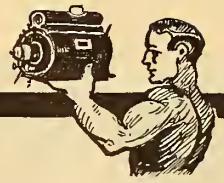


Front view of P-2 Projector, showing encased mechanism.

Equipment of Class "C" and "D" does not acquire a motor generator, provided 220 volt 3 phase alternating current and also 110 volt single phase alternating current is available. Where direct current only is available as a source of power supply a small motor generator set is furnished to convert the direct current to 110 volt single phase alternating current.

Notice!

All changes of addresses must be reported at least two weeks in advance of the date on which they are to become effective. Both new and old addresses must be given.



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features which you will appreciate include: elimination of the troublesome relay; mechanical simplicity; accuracy; economy in current and carbons; accommodates a full eight-inch trim without resetting the carbon; widely spaced bearings which assure perfect alignment throughout the entire trim; and ball bearing arc control which feeds the carbons continuously as consumed.

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Speed Control for Sound Sytems

(*Continued from page* 13)

change and, if the governing is to be made very close, some dashpot equivalent must be provided to prevent the tendency to hunt or oscillate back and forth before the equilibrium speed is reached.

The prime mover for the sound-picture equipment is an electric motor. Either direct or alternating current may be used but as the principles involved are the same with each, only the later need be discussed. The speed of the motor used is controlled by changing the impedance in its armature circuit. With high line voltage or light load the impedance is made a maximum, while with low line voltage

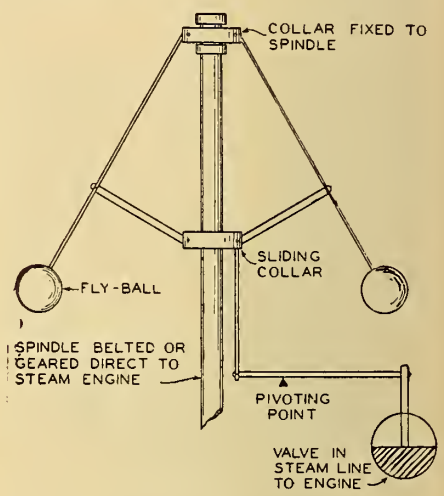


Fig. 1—Diagrammatic representation of a fly-ball governor showing how sensitivity may be changed by moving the pivoting point to the left or right.

or heavy load the impedance is made a minimum. A suitable governor, therefore, must be arranged to change this armature impedance at a very small change in motor speed (below 0.2 of one per cent) and must incorporate some arrangement to prevent oscillations.

Component Parts

In the sound-picture system the somewhat cumbersome fly-balls with their sliding collar and connecting levers to the steam valve are replaced by a few comparatively simple electrical circuits which act silently and instantly to correct the slightest change in speed of the driving motor. The electrical governing apparatus may be split up into three parts corresponding to those of the fly-ball governor. One part will substitute for the driving link (not shown in Figure 1) between the engine and the governor spindle, another for the fly-balls themselves and their connecting levers and a third for the steam valve that changes the torque of the engine.

The driving link for the electrical system is a 720 cycle generator coupled to the main driving motor of the projector unit.

The governing circuit proper is a special bridge circuit shown as Figure 2. One

(*Continued on page* 30)

Classified Index of Manufacturers and Dealers

Dealers

ALABAMA

Queen Feature Film Co., 1916½ Morris Ave., Birmingham, Ala.

ARIZONA

Arizona Film Supply Co., 323 Morley Ave., Nogales, Ariz.
Chester L. Dietderich, 100-A Pleasant St., Prescott, Ariz.

ARKANSAS

Butler Theatre Supply Co., Russellville, Ark.
Ensor & Co., 215 W. 3rd St., Little Rock, Ark.
Southern Film & Supply Co., 111½ Main St., Pine Bluff, Ark.

CANADA

Cameron Bros. Theatre Sup. Co., Regina, Can.
Canadian Theatre Supply Co., 22 Dundas St., West Toronto, Can.
Canadian Theatre Supply Co., Winnipeg, Can.
Coleman Elec. Co., 258 Victoria St., Toronto, Can.
Electrics, Ltd., Montreal, Quebec, Can.
Perkins Elec. Co., 21 Wilton Sq., Toronto, Ont.
Perkins Electric Co., 2027 Bleury St., Montreal, Can.
Perkins Electric Co., 402 Film Exchange Bldg., Winnipeg, Can.
Perkins Electric Co., Ltd., Wilton Square, Toronto, Can.
Aaron Stevens, 224 Eighth Ave., Calgary, Can.
Theatre Equipment Supply Co., 553 Granville St., Vancouver, Can.
United Electric Co., Ltd., 118 Granville St., Vancouver, B. C., Can.
Wells Bros. Amusement Co., Sylvan Ave., Toronto, Can.

CALIFORNIA

Bell & Slimson, 433½ E. 3rd St., Los Angeles, Cal.
Breck Photoplay Supply Co., 2028 S. Vermont Ave., Los Angeles, Cal.
Breck Photoplay Sup. Co., 98 Golden Gate Ave., San Francisco, Cal.
California M. P. Equip. Co., 836 S. Olive St., Los Angeles, Cal.
Davis Bros., 187 Golden Gate Ave., San Francisco, Cal.
Al. Du Bus, 1072 Wilton Pl., Los Angeles, Cal.
Electrical Products Co., 1128 W. 16th St., Los Angeles, Cal.
G. Gennert, 917 Maple Ave., Los Angeles, Cal.
Ed H. Kemp, 309 Turk St., San Francisco, Cal.
Los Angeles Motion Picture Co., 215 E. Washington St., Los Angeles, Cal.
Herbert S. Mace, Redlands, Cal.
Miles Bros. of California, 1149 Mission St., San Francisco, Cal.
National Theatre Supply Co., 1910 So. Vermont St., Los Angeles, Cal.
National Theatre Supply Co., 121 Golden Gate Ave., San Francisco, Cal.
National Theatre Supply Co., 147 Leavenworth St., San Francisco, Cal.
Walter G. Preddy, 187 Golden Gate Ave., San Francisco, Cal.
S. L. Russel, Film Exchange Bldg., Los Angeles, Cal.
J. Slipper & Co., 838 S. Olive St., Los Angeles, Cal.
Southern Electrical Supply Co., 3rd and East Sts., San Diego, Cal.
Theatre Ltg. & Equip. Co., 253 Golden Gate Ave., San Francisco, Cal.
Theatre Equipment Supply Co., 146 Leavenworth St., San Francisco, Cal.
Theatre Supply Co., 1956 Vermont St., Los Angeles, Cal.
Western Theatre Supply Co., 121 Golden Gate Ave., San Francisco, Cal.

CENTRAL AMERICA

J. Carter Searcy, Guatemala City, Guatemala.

COLORADO

National Theatre Supply Co., 2106 Broadway, Denver, Colo.

This entire Index is corrected to date. So far as possible it embraces every product, every manufacturer and every dealer of interest to projectionists. Manufacturers and Dealers are requested to look over this index carefully and report to us at once if their names are missing, wrongly spelled or wrong address listed. Insertions and corrections will be made at once.

CONNECTICUT

Corrigan's Theatre Equip. Co., 50 W. Main St., Waterbury, Conn.
National Theatre Supply Co., 131 Meadow St., New Haven, Conn.
Repass, Harries & Co., 255 Franklin Ave., Hartford, Conn.
Conn. Independent M. S. Co., 131 Meadow St., New Haven, Conn.
Independent M. S. Co., 131 Meadow St., New Haven, Conn.

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Griffith, G. W., Box 2333, Tampa, Fla.
Tampa Photo & Art Supply Co., 314 Twiggs St., Tampa, Fla.

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Eugene Wilde, P. O. Box 102, Atlanta, Ga.

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E. E. Fulton Ct., 1018 So. Wabash Ave., Chicago, Ill.
Holke Theatre Supply Co., 845 So. State St., Chicago, Ill.
Joseph Hopp, 57 E. Jackson Blvd., Rm. 604, Chicago, Ill.
Illinois Theatre Equip. Co., 12-14 E. 9th St., Chicago, Ill.
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Midwest Ticket & Supply Co., 845 So. Wabash Ave., Chicago, Ill.
Monarch Theatre Supply Co., 724 So. Wabash Ave., Chicago, Ill.
Movie Supply Co., 844 So. Wabash Ave., Chicago, Ill.
National Theatre Supply Co., 825 So. Wabash Ave., Chicago, Ill.
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H. Liever Co., 24 W. Washington St., Indianapolis, Ind.
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National Theatre Supply Co., 1004 Grand Ave., Des Moines, Iowa.
National Theatre Supply Co., 10th and High Sts., Des Moines, Iowa.
Zimmerman Brothers, Sioux City, Iowa.

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Electrical Supply Co., 324 Camp St., New Orleans, La.
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Southern Theatre Equipment Co., New Orleans, La.
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Lewy Studios, 853 No. Eutaw St., Baltimore, Md.
National Theatre Supply Co., 228 Gay St., Baltimore, Md.
Townsend, H. S., 1625 E. 29th St., Baltimore, Md.
Wyatt, E. J., 1605 No. Milton Ave., Baltimore, Md.

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Gately, J. F., 33 Lyman St., Springfield, Mass.
Handy, A. D., Boston, Mass.
Independent Theatre Supply Co., 49 Church St., Boston, Mass.
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Wheaton, L. B., Worcester, Mass.
Worcester Film Corp., 340 Mason St., Worcester, Mass.

MICHIGAN

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Exhibitors' Supply Co., 14 Elizabeth St., Detroit, Mich.
Feldstein, A. N., 1670 Pasadena Ave., Detroit, Mich.
Theo. Kundtz & Co., 402 Lincoln Bldg., Detroit, Mich.
McArthur Equip. Co., 1963 Grand River Ave., Detroit, Mich.
National Theatre Supply Co., 2105 John R St., Detroit, Mich.
Service Theatre Supply Co., 137 Elizabeth St., Detroit, Mich.

MINNESOTA

Cunningham, H. B., 964 University Ave., St. Paul, Minn.
General Distrihuting Co., 110 Lake Ave., So., Duluth, Minn.
Huntleys, The, Winona, Minn.
Lochran Film & Slide Service, 706 Film Exchange Bldg., Minneapolis, Minn.
National Equipment Co., 409 W. Michigan Ave., Duluth, Minn.
National Theatre Supply Co., 221 Loeh Arcade, Minneapolis, Minn.
Rialto Theatre Supply Co., 56 Glenwood Ave., Minneapolis, Minn.
Twin City Caldium & Supply Co., 706 First Ave., N., Minneapolis, Minn.
The Western Equip. Exchange, 35 Western Ave., Minneapolis, Minn.

MISSISSIPPI

Southern Theatre Service, P. O. Box 455, Grenada, Miss.

MISSOURI

Cole Theatre Supply Co., 109 W. 18th St., Kansas City, Mo.
Erker Bros. Optical Co., 608 Olive St., St. Louis, Mo.
Exhibitors' Supply Co., 3316 Lindell St., St. Louis, Mo.
Fulco-Schaffer Co., 3301 Olive St., St. Louis, Mo.
Fulton, E. E., & Co., 3403 Olive St., St. Louis, Mo.
National Theatre Supply Co., 108 W. 18th St., Kansas City, Mo.
National Theatre Supply Co., 3315 Olive St., St. Louis, Mo.
Opera Supply Co., 601 Shubert Bldg., St. Louis, Mo.
Sanderson Elec. Co., St. Louis, Mo.
Scweig & Engel Theatre Supplies, St. Louis, Mo.
Star Film & Supply Co., 413 Edward St., St. Joseph, Mo.
Stebhins, Charles M., Picture Supply Co., 1822 Wyandotte St., Kansas City, Mo.
Yale Theatre Supply Co., 108 W. 18th St., Kansas City, Mo.
A-A Electric Machinery Co., 1117 Cherry St., Kansas City, Mo.

MONTANA

Western Theatre Equipment Corp., Billings, Mont.

NEBRASKA

Eastman Kodak Stores, Inc., Lincoln, Neb.
Lincoln Photo Supply Co., Omaha, Neh.
National Theatre Supply Co., 1514 Davenport St., Omaha, Neh.
Quality Theatre Supply Co., 1605 Davenport St., Omaha, Neb.
Serviee Theatre Supply Co., 303 No. 16th St., Omaha, Neh.
U. S. Theatre Supply Co., 1506 Davenport St., Omaha, Neb.

Dealers

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Kaufman, Frank N., 750 Broad St., Newark, N. J.
Metropolitan Motion Picture Co., 116 Market St., Newark, N. J.

NEW MEXICO

Eastern New Mexico Theatre Supply Co., Box 548, Clovis, N. M.

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Acme Exchange, 341 W. 44th St., N. Y. City.
Amusement Supply Co., 729 Seventh Ave., N. Y. City.
Auburn Film Co., Auburn, N. Y.
Auburn Theatrical Supply Co., Auburn, N. Y.
A. Z. Motion Picture Supply Co., 266 Houston St., N. Y. City.
A. Z. Motion Picture Supply, 1413 Bedford Ave., Brooklyn, N. Y.
Becker Theatre Supply Co., 416 Pearl St., Buffalo, N. Y.
Behrend Motion Picture Supply Co., 729 Seventh Ave., N. Y. City.
Bender, George, 28 Centre St., N. Y. City.
Better Service Film Co., 110 Ferris Ave., Syracuse, N. Y.
Capitol Motion Picture Supply Co., 727 Seventh Ave., N. Y. City.
Capitol Stg. & Ltg. Co., 626 Tenth Ave., N. Y. City.
Columbia Stg. Ltg. Co., 709 Columbia Theatre Bldg., N. Y. City.
Crouse, Hinds Co., Wolf and 7th Sts., Syracuse, N. Y.
Crown Motion Pic. Supplies, 729 Seventh Ave., N. Y. City.
Empire Theatre Supply Co., 42 Orange St., Albany, N. Y.
Empire Theatre Sup. Co., 619 Spring St., Utica, N. Y.
Fenyvessey, Carol, Rochester, N. Y.
Gennert, G., 24 E. 13th St., N. Y. City.
Greenbaum, 436 Cornelius St., Brooklyn, N. Y.
Herbert & Huesgen, 18 E. 42nd St., N. Y. City.
Hudson Elec. Equip. Co., 141 W. 44th St., N. Y. City.
Independent Movie Sup. Co., 42 Orange St., Albany, N. Y.
Lyon, J. T. & D. B., Schenectady, N. Y.
Kaplan, Sam, 729 Seventh Ave., N. Y. City.
Mason, Chas. E., 103 W. Main St., Rochester, N. Y.
Mestrum, H., 817 Sixth Ave., N. Y. City.
Modern Elec. Mch. Co., 2927 Third Ave., N. Y. City.
Motion Picture Apparatus Co., 110 W. 32nd St., N. Y. City.
Motion Picture Service Co., 417 W. 44th St., N. Y. City.
National Theatre Supply Co., 1560 Broadway, N. Y. City.
National Theatre Supply Co., 416 Pearl St., Buffalo, N. Y.
Charles J. Newton, 244 West 14th St., New York City.
Perfection Supply Co., 98 Park Pl., N. Y. City.
S & M Sales Co., 123 Lafayette St., Utica, N. Y.
Supreme Motion Picture Repair Co., 926 Broadway, Brooklyn, N. Y.
Syracuse Supply Co., 314 W. Fayette St., Syracuse, N. Y.
United Proj. & Film Corp., 51 Chapel St., Albany, N. Y.
United Proj. & Film Corp., 228 Franklin St., Buffalo, N. Y.
Univ. Elec. Stage Ltg. Co., 321 W. 50th St., N. Y. City.

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Carolina Theatre Supply Co., United Film Bldg., Charlotte, N. C.
Ettabran Film Co., Charlotte, N. C.
Exhibitors' Supply Co., Charlotte, N. C.
National Theatre Supply Co., 222 W. 4th St., Charlotte, N. C.

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Artfilm Co., Cleveland, Ohio.
Bodiker, D. A., 128 No. Garfield St., Dayton, Ohio.
Central F. F. Co., 60 Public Sq., Lima, Ohio.
Cincinnati Theatre Supply Co., Broadway Film Bldg., Cincinnati, Ohio.
Cincinnati M. P. Co., 1434 Vine St., Cleveland, Ohio.
Dayton Theatre Sup. Co., 225 Jefferson St., Dayton, Ohio.
Doner, Frank M., 2409 Maple Wood Ave., Toledo, Ohio.
Dwyer Bros. & Co., 520 Broadway, Cincinnati, Ohio.
Exhibitors' Supply Co., 2112 Payne Ave., Cleveland, Ohio.
Folwer & Salter, Cleveland, Ohio.
Gross & Johnson, 2100 Payne Ave., Cleveland, Ohio.
Limbocker, George, Springfield, Ohio.
Motion Picture Equip. Co., 17 Ervin Block, West Canton, Ohio.
Moving Picture Equip. Co., 208 Market Ave., So., Canton, Ohio.
Moving Picture Supply Co., 439 Falls Ave., Youngstown, Ohio.
National Theatre Supply Co., 2112 Payne Ave., Cleveland, Ohio.
National Theatre Supply Co., 520 Broadway, Cincinnati, Ohio.
O'Connor & Co., A., 9702 Euclid Ave., Cleveland, Ohio.
Oliver Moving Pic. Sup. Co., Film Exchange Bldg., Cleveland, Ohio.
Post Glover Elec. Co., Cincinnáti, Ohio.
Price. L. M., Co., 108 W. 4th St., Cincinnati, Ohio.
Romell Motion Pictures, Inc., 1411 Walnut St., Cincinnati, Ohio.
Runey, Clarence E., 1434 Vine St., Cincinnati, Ohio.
Standard Film & Service Co., Cleveland, Ohio.
Theatre Supply Co., 2112 Payne Ave., Cleveland, Ohio.
Tri-State Supply Co., 2112 Payne Ave., Cleveland, Ohio.

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Anderson Theatre Supply Co., 116 So. Hudson St., Oklahoma City, Okla.
National Theatre Supply Co., 308 W. California St., Oklahoma City, Okla.
United Theatre Equip. Corp., 116 So. Hudson St., Oklahoma City, Okla.
Yale Theatre Supply Corp., 10 So. Hudson St., Oklahoma City, Okla.
Southern Theatre Equip. Co., 328 California Ave., Oklahoma City, Okla.
Shelton, J. M., Oklahoma City, Okla.

OREGON

Bentley, E. E., Hillsboro, Ore.
Conant, C. F., Portland, Ore.
National Theatre Supply Co., 60 Glisan St., Portland, Ore.
National Theatre Supply Co., 393 Oak St., Portland, Ore.
Portland Moving Picture Mch. Co., Rivoli Theatre Bldg., Portland, Ore.
Service Film & Supply Co., 393 Oak St., Portland, Ore.

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Atlas Supply Co., 108 Ring St., Philadelphia, Pa.
Bates, George, 662 Shade St., Pittsburg, Pa.
Bennell, Chas. H., 261 No. Clarion St., Philadelphia, Pa.
Bennett, C. H., 224 No. 13th St., Philadelphia, Pa.
Catsiff, J., 1214 Market St., Philadelphia, Pa.
Chamberlain Amuse, Enter., Inc., Shamokin, Pa.
Columbia Film Service, 1010 Forbes St., Pittsburgh, Pa.
Consolidated Film Co., 1237 Vine St., Philadelphia, Pa.
Electric Theatre Supply Co., 1309 Vine St., Philadelphia, Pa.
Gompertz, Abram B., Exhibitors' Clearing House & Supply Co., 1243 Vine St., Philadelphia, Pa.
Hannson, J. G., 10th and Spring Sts., Reading, Pa.

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National Theatre Supply Co., 1311 Vine St., Philadelphia, Pa.
Phila. Theatre Equip. Co., 252 No. 13th St., Philadelphia, Pa.
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Consolidated Film & Supply Co., 226 Union Ave., Memphis, Tenn.
Monarch Theatre Supply Co., 228 Union Ave., Memphis, Tenn.
White Theatre Equipment Co., Phipps Bldg., Bristol, Tenn.

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Atlantic Sales Co., 1816 Main St., Dallas, Tex.
Dallas Theatre Supply Co., 1911 Commerce St., Dallas, Tex.
National Theatre Supply Co., 306 So. Harwood St., Dallas, Tex.
Peerless Film Svc., 322 San Antonio St., El Paso, Tex.
Educational Equip. Co., 1913-A Commerce St., Dallas, Tex.
Simplex Theatre Supply Co., Film Exchange Bldg., Dallas, Tex.
Simpson, James P., Co., Inc., Dallas, Tex.
Southern Film Svc., 811 Franklin Ave., Houston, Tex.
Southern Theatre Equip. Co., 1815 Main St., Dallas, Tex.
Thrash, R. D., Co., Film Row, Dallas, Tex.

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Alhambra Theatrical Co., Hudson Ave., Ogden, Utah.
Argus Enterprises Co., Inc., 132 E. Second St., Salt Lake City, Utah.
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Salt Lake Theatre Supply Co., 48 Exchange Pl., Salt Lake City, Utah.
Universal Film & Supply Co., 56 Exchange Pl., Salt Lake City, Utah.
Utah Theatre Supply Co., 125 E. 2nd South St., Salt Lake City, Utah.
Worman Supply Co., 2429 Hudson Ave., Ogden, Utah.

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Capitol Theatre Supply, 316 McGill Bldg., Washington, D. C.
Carroll Electric Co., 714 12th St., N. W., Washington, D. C.
Colman, 916 G St., N. W., Washington, D. C.
Columbia Photo Supply Co., 1424 New York Ave., N. W., Washington, D. C.
Fuller & D'Albert, 815 10th St., N. W., Washington, D. C.
Higgins, F. L., 804 11th St., N. W., Washington, D. C.
L & S Theatre Sup. Co., 908 G St., N. W., Washington, D. C.
Theatre Supply Co., 916 G St., N. W., Washington, D. C.
Lust, Sidney B., 916 G St., N. W., Washington, D. C.
National Theatre Supply Co., 719 9th St., N. W., Washington, D. C.
Scientific & Cinema Supply Co., 804 11th St., N. W., Washington, D. C.
Southern Moving Picture Corp., 310 McGill Bldg., Washington, D. C.
Thompson, E. B., 722 10th St., N. W., Washington, D. C.
Washington Theatre Supply Co., 719 9th St., N. W., Washington, D. C.

WASHINGTON

Film Supply Co., 217 Virginia St., Seattle, Wash.
Graham, John W., Spokane, Wash.
Lowman & Handford, Seattle, Wash.
National Theatre Supply Co., 1927 Third Ave., Seattle, Wash.
Shearer, B. F., Inc., 210 Virginia St., Seattle, Wash.
Spokane Theatre Supply Co., 410 W. 1st St., Spokane, Wash.
Theatre Supply Co., 2016 Third Ave., Seattle, Wash.

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Charleston Theatre Supply Co., Charleston, W. Va.
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Chicago Stage Lighting Co., 112 No. La Salle St., Chicago, Ill.
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Enterprise Optical Mfg. Co., 564 W. Randolph St., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
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Motion Picture Service Co., 417 W. 44th St., New York City.
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Diesman, J. D., Baltimore, Md.
M. G. Felder, 1560 Broadway, New York City.
Hiegel, Frank J., 440 State St., Schenectady, N. Y.
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Phellis & Co., C. W.
Hugo Reisinger, 11 Broadway, New York City.
Warner Prod. Co., Inc., 265 Canal St., New York City.

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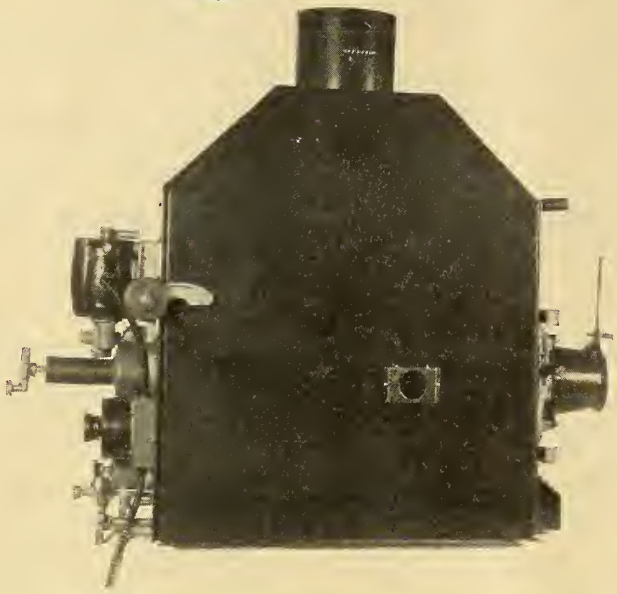
Ajax Film Accessories Co., 30 Church St., New York City.
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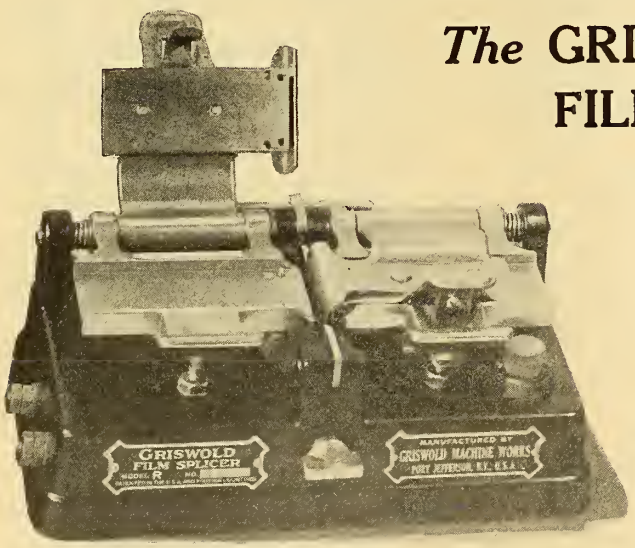
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Speed Control for Sound Systems

(*Continued from page* 26)

arm of the bridge has a fixed inductance and condenser in series, which are adjusted to tune the circuit to 720 cycles. At this frequency the impedance of this arm is a resistance only and the impedance of the arm D is made a resistance of the same value. At 720 cycles the ratio of these two arms, therefore, is unity, as is that of the other two arms, made up of the primary of a transformer divided at its half tap. The small alternator, connected across the transformer, thus becomes the source of power for the bridge.

This arrangement makes an extremely sensitive analogy to the fly-ball governor and lever system. The potential E, from the mid-point of the coils A and B to the junction of arms C and D, which is zero at 720 cycles, shifts its phase 180° as the speed changes from any frequency below 720 cycles to any above it. Below 720 cycles the current in C is leading due to the predominance of the condenser and above 720 it is lagging due to the predominance of the inductance. Instead, therefore, of a gradual change as the speed changes from its desired value there is an abrupt one which furnishes a basis for accurate speed control.

Controlling the Speed

Acting as the steam valve to control the speed of the motor is an impedance coil with three legs shown as Figure 3. The two outer legs, L_1 and L_2, are connected to the motor armature and serve as the impedance controlling the speed. The middle leg, G, carries a direct current winding. As the current in this winding increases the magnetic flux in the two outer branches increases to saturation and their

(*Continued on page* 32)

A Projectionist Goes to the Movies

(*Continued from page* 10)

provements. Much poor projection work would be eliminated were the exhibitor to give his projectionist a moderate budget with which to effect these improvements. Some of the work produced with inferior equipment is surprisingly good.

"Keystone" Apparent

After the sound sequence there came a silent portion of the picture, and it was here that the "keystone" effect of the picture received our attention. The sides of the picture were parallel but everything was drawn out from top to bottom, with resultant distortion. It probably is useless to again mention the necessity for the designing of theatres so that the projection lenses are on a horizontal line with the center of the screen. And this particular theatre is not open a year yet!

During some of the scenes the progress made in the manufacture of "non-halation" film was in evidence. One scene included a dresser upon which were several clear glass lights, and one could see the brightly burning filaments without halation

Where to Buy *Good* Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

These Dealers, by the fact of their being on this page, show that they value your friendship and your good-will. They appreciate your importance as a buying power. Instead of ignoring your existence or trying to reach you inexpensively by reaching your theatre manager, they are advertising direct to you. Let this show of good-will be mutual.

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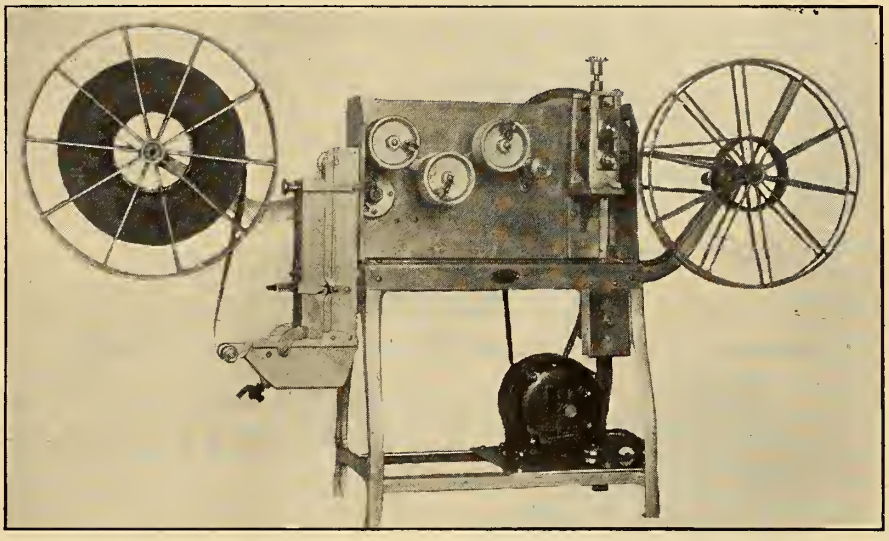
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just as plain as could be. Remember the old days when everything that shone or sparkled had a halo around it?

After the feature was concluded, with a powerful climax that got a big hand from the audience, the trailer went on and, just like a letter from home, the organ pealed forth. I noticed particularly the good spirit of the audience while the organ was playing, and I for one am convinced that organs should be retained in every picture house *in addition* to sound apparatus.

Then came a Movietone news which was very good and was put on faultlessly by the boys in the projection room.

So ended a good show and an enjoyable evening. The difference between this show and the one we had seen one week previous, was pronounced, and I fail to attribute it to the quality of the subjects programmed. The later show simply had the advantage of being done up brown with all the necessary trimmings, organ and all, and provided a well-rounded out program. This would seem to indicate that a *good* show handled poorly is at a disadvantage to the *bad* show put over properly. What is meant is that poor work spoils the best shows, but that good work means a whole lot to a weak show.



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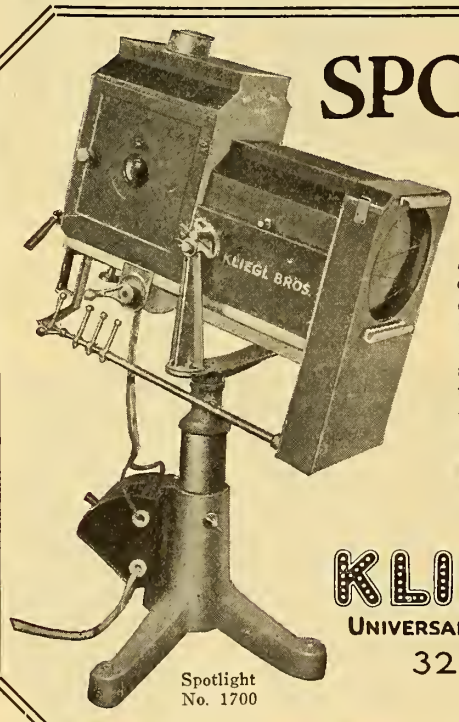
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Sound Speed Control

(*Continued from page* 30)

impedance decreases. The torque of the motor varies inversely with the reactance of the coils, L_1 and L_2, and as a result the greater the direct current flowing into the coil G, the higher will be the torque of the motor.

The link betwen the bridge and the three-legged inductance is a vacuum-tube circuit which causes more direct current to flow as the motor speed tends to fall. This complete circuit, shown in Figure 4, includes the detector tube V_4, and two tubes V_1 and V_2 which supply current for the middle winding of the impedance coil. Tube V_3 is a rectifier to supply excitation for the 720 cycle alternator and grid biasing voltage for V_1, V_2 and V_4.

Plate potential for V_4 comes from the alternator through the transformer T_4, and its phase is fixed. Grid potential for this tube is from the bridge output circuit, E, the phase of which shifts 180° as the alternator speed changes from below to above 1200 r.p.m. This 180° shift of phase changes the potential of the grid relative to the plate from negative to positive or

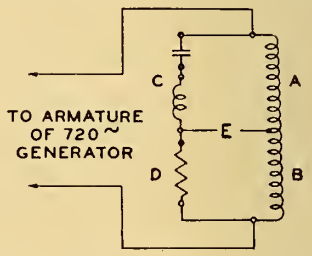


Fig. 2—The heart of the sound-picture governor. Potential E shifts 180° in phase as the speed changes from any value below 1200 r.p.m. to any value above it.

vice versa, and thereby causes a relatively large change in the plate current, which, flowing through R_1 causes a correspondingly large change in the grid potential of tubes V_1 and V_2, and thus in the direct current to the impedance coil.

The bridge circuit makes a very sensitive governing device but with it alone some permanent change in speed would be required to compensate for each change in load or line voltage. Something else must be added if the speed is to be constant for all conditions. Also, some dashpot equivalent must be used to prevent the speed oscillations mentioned.

These two functions are accomplished by a network composed of R_2, R_3, R_4, and C_2, properly connected to the other circuits. Current flowing in the plate circuit of V_1 and V_2 to the coil of G flows also through R_2 and R_3. The drop across C_2 which after a short preliminary period is the same as that through R_2, feeds back a potential to the grid circuit of V_4, and thereby causes the additional regulation required. To slow down the action of this feed back, however, R_4 in series with C_2 is connected in parallel with R_2 as shown. The fed back potential is that across C_2 and this rises or falls slowly as the condenser must be charged or discharged through the high resistance R_4.

Combination Signal-Changeover

A DEVICE to signal the approach of the end of a reel of film has been developed and patented applied for by Messrs. Edson F. Lynch and Harry R. Whitehead, projectionists of Evansville, Indiana, Local 367. Mr. Lynch, in a letter attached to the accompanying diagrams, states that several of his devices are now being used by brother projectionists, who have found them satisfactory in every respect.

Mr. Lynch emphasizes the fact that his development may be rigged to also throw a switch and thus provide an entirely automatic changeover, in addition to its function of sounding a warning for the end of a reel.

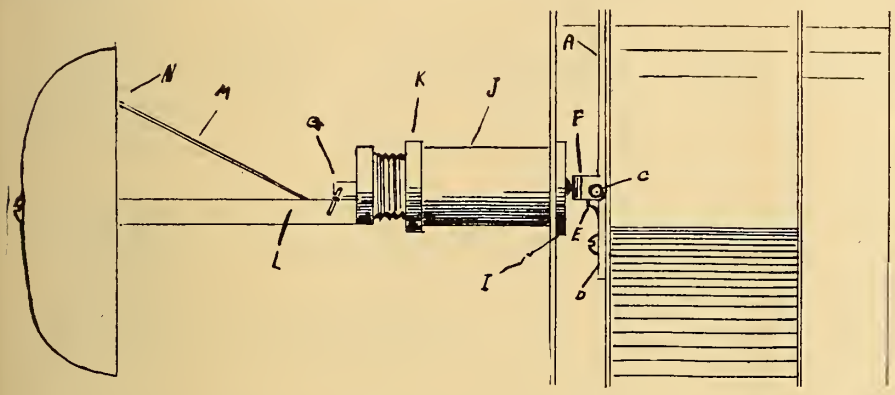


Fig. 1—Showing device in operating position

The following description of the device is furnished by Mr. Lynch:

It consists of a tripping device and a bell. It can also be arranged to throw a switch or perform any similar action. It is attached to the reel and magazine as shown on the drawings.

Method of Operation

With the lever (A) in an upright position and held there by spring (B) and stop (E), as shown by Figure 1, the projectionist winds on a few turns of film—for example, 5 turns. He then presses lever (A) down to a position as shown by Figure 2, and holds it there until he has wound on another turn of film which serves to keep it in that position. The balance of the film is then wound on as usual.

The film is then placed in the magazine and is run off in the usual manner. When the fifth turn from the end is reached the lever (A), being uncovered, will fly up to a position as shown on Figure 1. It is raised to that position by the spring (B). The revolution of the reel will then cause the anvil (F) to strike the bell plunger (G). Each revolution of the reel will cause the bell to sound one stroke, utnil the end of the film is reached. By counting the bell strokes the projectionist can tell the exact moment when the end of the film will be reached.

(This device is very interesting and is an indication of the sort of improvements that can be effected by projectionists if only they apply themselves. It is difficult to tell from the diagrams whether this device is adaptable to the ordinary reels shipped out from the exchanges. It is doubtful whether there is sufficient room between the magazine and the reel to permit ample clearance for the attachment of this device, but since Mr. Lynch states that several projectionists are using it with success, it apparently is all-right. Mr. Lynch might inform us whether he uses regular exchange reels with his device or has to use special reels.—THE EDITOR.)

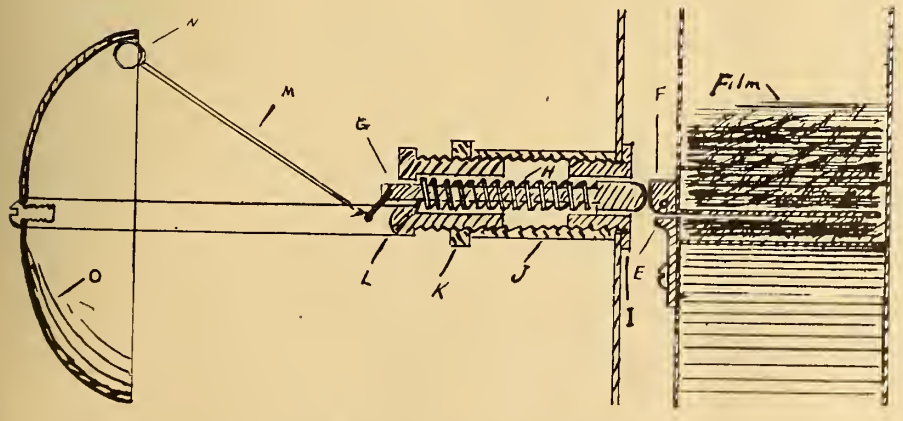
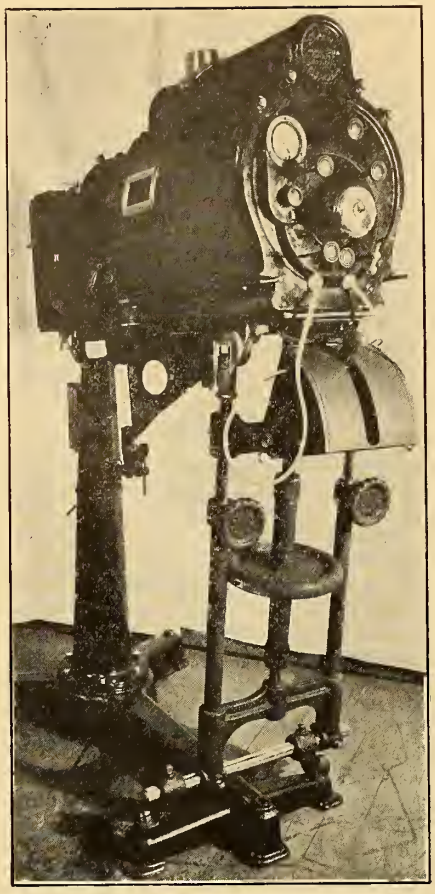


Fig. 2—Device in normal position



MESTRUM'S combination lamphouse carriage and pedestal brace for Simplex projectors insures perfect rigidity and eliminates all vibration. Can be used with old-style, 3-point base or with new-style, 5-point base, especially with Movietone and Vitaphone. Installed quickly without machine work.

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The Leading Journal of the British Cinematograph Industry

20th Year of Weekly Publication

Contains a complete section each week for the special benefit of Projectionists.

Cash prizes awarded for original ideas published. Specimen copies 18 cents.

Annual Subscription 7 dollars 50

THE BIOSCOPE PUBLISHING CO., Ltd.
8-10 Charing Cross Road, London, W. C. Eng.

Motor Generator Compensarcs

ALL compensarcs are carefully inspected in the factory and tested on a projection arc lamp under actual operating conditions (as near as they can be secured in a factory), so that when received by the customer they are all ready to be set up and run. Every effort is made that the machines shall give perfect satisfaction to the manager and operator.

If trouble is experienced do not blame the machine until you are certain that the trouble does not lie either in some other part of the equipment or in some unusual local condition.

Machine Does Not Start

If the machine does not start when the switch is closed, first examine the fuses and make sure that the current is on at the switch terminals. It sometimes happens that a single fuse has blown on a three-phase three-wire outfit in which case the compensarc will run as a single-phase machine but if stopped will not start again until the blown fuse has been replaced if a single-throw switch be used.

However, if a double-throw starting switch be used the compensarc will be started up on the unfused side, therefore the missing fuse must be detected by the operation of the machine while running. If a fuse is missing it can usually be detected by the unusual noise made by the machine while running, by the motor end heating excessively and more particularly by change in speed with change in load and general unsteadiness of the arc. If a fuse be blown it should be replaced at once, for it may save the burning out of the motor.

Sparking at the Brushes

When a vicious sparking develops under the brushes of the compensarc it is an indication that something is wrong. The most usual causes are:

(a) Dirt on the Commutator or Brushes.

The brushes should be removed from the holders and wiped off occasionally so that they will not become gummy and stick in the boxes. When brushes are dirty they will not make proper contact with the commutator and sparking will result.

It is a good plan to take the brushes out of the boxes once a week and carefully clean them. Do not take the pigtails loose from the brush-holders and be sure to place the brushes back in the boxes in their original position for if they are turned around poor contact is made.

(b) Uneven Wearing of the Commutator.

Uneven wearing of the commutator will sometimes result in the mica protruding slightly above the commutator surface. In this case the commutator should be trued up. There should be a slight endwise movement of the armature, about 1/16 inch, which will cause the brushes to wear evenly across the face of the commutator and prevent their wearing grooves in the commutator face.

(1) Wrong Spring Pressure on the Brushes.

There should be just sufficient pressure on the brush springs to insure good contact between brushes and commutator.

(d) Open or Short Circuit in Armature.

This trouble will most often occur near where the armature winding is connected to the commutator and results generally from a bruise in handling or some foreign body getting caught in the armature or from a chip caught when commutator is being turned or repaired. If an open circuit the trouble is very apparent, since the long heavy spark accompanying it generally eats away the mica between the segments on each side of the break and thus shows its location.

A short circuit in the armature will show at once by the excessive heating and perhaps smoking of the coil or coils short circuited, and if the operation is continued, the machine will be burned out. Where trouble of this kind is suspected, the necessity of prompt attention by an electrician is obvious.

(e) Overload.

If considerably more current is being taken by the lamp than the machine is designed for, sparking may result. See that the machine is not excessively overloaded.

(f) Brushes in Wrong Position.

If the brushes are left in the same position as when the machine is received, trouble will not occur from this cause. If brushes are ever moved or changed see that they are put back where they belong and that marks on brush yoke and bearing housing agree.

Machines Make Excessive Noise

This is most often due to a weak floor or to the machine not setting firm and level. If the noise seems to be in the machine itself and nothing can be observed out of place, send for an electrician, as the trouble may be serious.

Sound Film Test Laboratory

Bell Telephone Laboratories, from whose research department has issued the outstanding contributions to the development of sound pictures, has announced the installation at their New York offices of a sound film test laboratory. This new department will use sound films for experimental work only and no commercial production will be undertaken.

Extensive experiments on acoustics will be launched in a special studio provided with adjustable acoustic treatment to control the reflection of sound from walls and ceiling.

New Cinephone Turntable

Powers Cinephone announces the development of a turntable attachment for use with its reproducing equipment (film method). It will play both synchronous and non-synchronous discs, according to P. A. Powers, company head. This will be supplied as extra equipment to theatres who ask a dual reproducing system.

Cinematographer Has Its Say on "Sound"

THE *American Cinematographer*, cameraman's publication, says its bit regarding the effect of sound pictures on photographic standards. The comment is headed "To Hell with Photography! What About Sound?" and follows in part:

"Sound is in the pictures to stay. Beauty in cinematography is essential to the popularity of the films and upon them both depends the success of the cinema.

"The motion picture industry has grown to its present importance by means of the silent picture embellished with the beauty placed in the film by the artistry of the cinematographer, and is this great artist to be treated like an intruder in his own house because zealots of the more mechanical department of sound technique assume a superiority which exists only in their own minds.

"Cooperation! In that sign shall the sound pictures triumph and that means that both cinematographer and sound engineer shall be put and maintained in his proper place.

"And this brings us to the heading of this paragraph. In a certain large Hollywood studio, a few days ago, the cinematographer in charge of the set was discussing the problems of getting better photography in the sound sequences, when the arbiter of sound gave voice to this expression. The cinematographer might have come right back with a reversal of this phrase, but he did not.

"The A. S. C. magazine does not believe the producer feels that way about it and it is equally certain that the "cash customers" out in front of the screen are not going to share in such a sentiment."

Healthful Electricity

Ordinarily we think of electricity as adding greatly to man's efficiency and comfort. A recent electro-therapeutic show in New York has called attention to electricity's numerous uses for health.

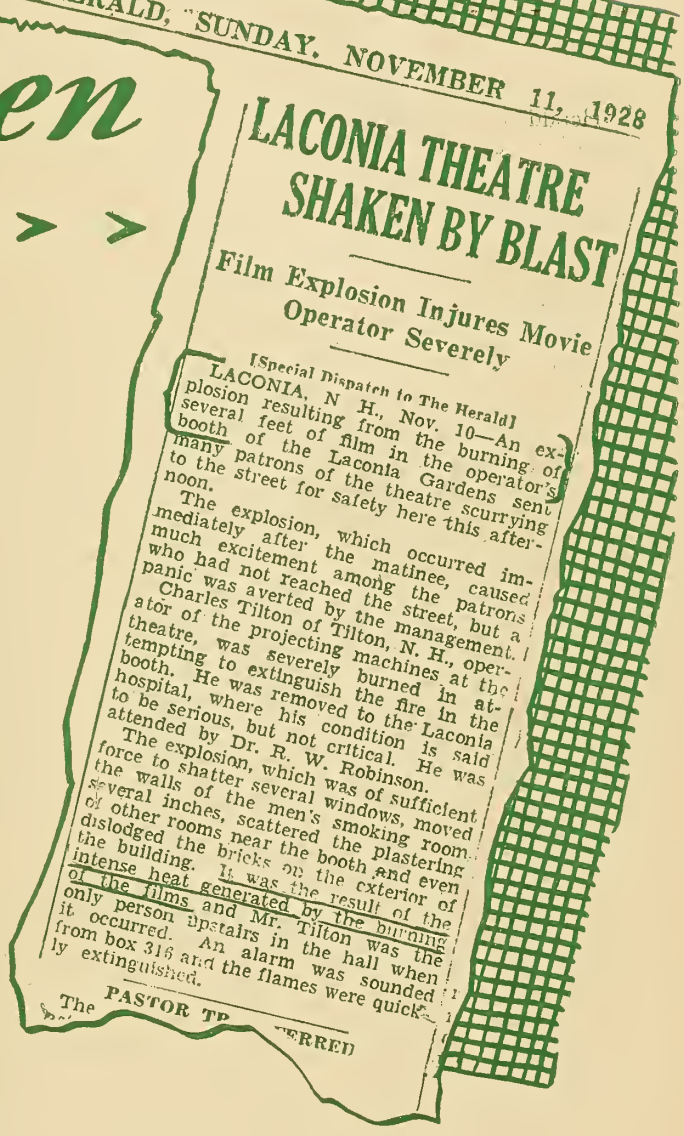
At that show there was assembled an astonishing array of mechanism to be used for promoting physical well-being. There were electric baths, automatic electric exercisers adapted to the needs of individual muscles, electric rejuvenators, electric heating pads, blankets and socks, and so on, through a long list.

One of the newer and less familiar devices was the diathermic apparatus, a heater that warms from within instead of from the outside. Previously, hot applications have been placed on the surface of the body and the heat has had to penetrate slowly, losing some of its warmth in the process. The new device consists of two electric plates engendering heat which is greatest midway between them. The warmth therefore can be directed to the interior of the body, leaving the surface comparatively cool.

The uses of electricity seem to be limited only by human ingenuity in discovering them. And that, too, seems to be limitless.

Don't

let this happen to you



THE BOSTON HERALD, SUNDAY, NOVEMBER 11, 1928

LACONIA THEATRE SHAKEN BY BLAST

Film Explosion Injures Movie Operator Severely

[Special Dispatch to The Herald]

LACONIA, N. H., Nov. 10—An explosion resulting from the burning of several feet of film in the operator's booth of the Laconia Gardens sent many patrons of the theatre scurrying to the street for safety here this afternoon.

The explosion, which occurred immediately after the matinee, caused much excitement among the patrons who had not reached the street, but a panic was averted by the management.

Charles Tilton of Tilton, N. H., operator of the projecting machines at the theatre, was severely burned in attempting to extinguish the fire in the booth. He was removed to the Laconia hospital, where his condition is said to be serious, but not critical. He was attended by Dr. R. W. Robinson.

The explosion, which was of sufficient force to shatter several windows, moved the walls of the men's smoking room several inches, scattered the plastering of other rooms near the booth and even dislodged the bricks on the exterior of the building. It was the result of the intense heat generated by the burning of the films and Mr. Tilton was the only person upstairs in the hall when it occurred. An alarm was sounded from box 316 and the flames were quickly extinguished.

The PASTOR TR... ERRED

the certain preventive is

SENTRY SAFETY CONTROL

SENTRY SAFETY CONTROL CORPORATION

13th and Cherry Sts., PHILADELPHIA 1560 Broadway, NEW YORK

And All Branches of

NATIONAL THEATRE SUPPLY COMPANY

The positive fire preventer. Can be attached to any projector. Costs only a few cents a day.

BUCKLED AND WARPED FILM

"This trouble not only Exists, but is rampant"

Says F. H. RICHARDSON

Reprinted from
Better Theatres Section of Exhibitors Herald and Moving Picture World, Sept. 29th issue.

Buckled Film

———, projectionist, ———— tre, Bay City, Tex., leads off, in a letter, with kind words for the sound synchronization articles, laying stress upon the fact that he is able to understand my "practical matter of fact way of making explanations." Then he says:

* * *

Now for my troubles, which believe you me are adding gray hair to my bean. Every once in a while I get a film which cannot possibly be focused perfectly on the screen. Sometimes it is just parts and sometimes a whole feature program. Always the same parts fail to focus when they pass through. On nights when I have trouble with one film, one from another exchange will run perfectly. The prints giving most trouble are all one make. In fact I have more or less trouble with all that make and none with other makes.

Use Power Six B projectors, with Peerless reflector type lamps, Cinephor No. 1 projection lenses, 4.75" E. F., asbestos cooling plates; projection distance about 71 feet.

I have proven to my own satisfaction that the trouble is not in the lenses. The only way I can do away with it is to reduce the size of the picture and substitute straight arcs for the Peerless lamps. Using the Motiograph incandescent lamp does not help.

I wrote the film manufacturer (producer) regarding the trouble, but they answered that I was the only one who had made such complaint, which means just nothing at all to me because I know of three theatres in which the same trouble is experienced with their prints. But what good does it do to complain anyhow?

I have ordered a pair of new film gates and if they don't help I am up against a bad proposition and if you can help me I will be quite willing to pay you any sum up to say $250, because the matter is a serious one to me, who feels that my reputation as a projectionist is at stake.

* * *

Brother ———, there is no charge for anything I can attend to through the medium of this department.

As to your trouble, first of all, it borders upon the silly for a producer to make that sort of answer, when said producer should know and I think undoubtedly does know that this trouble not only exists, but is rampant.

The trouble unquestionably is primarily due to the intensely hot spot which all light sources except the straight arc now produce. By that I mean that while the straight arc is itself plenty bad enough when used at high amperage, still the heavy condenser used with it serves to absorb a large percentage of the heat rays. Same condenser used with high intensity, true, but the heat of that light source is enormous. It could not be used at all, I think, without a heat absorbing condenser.

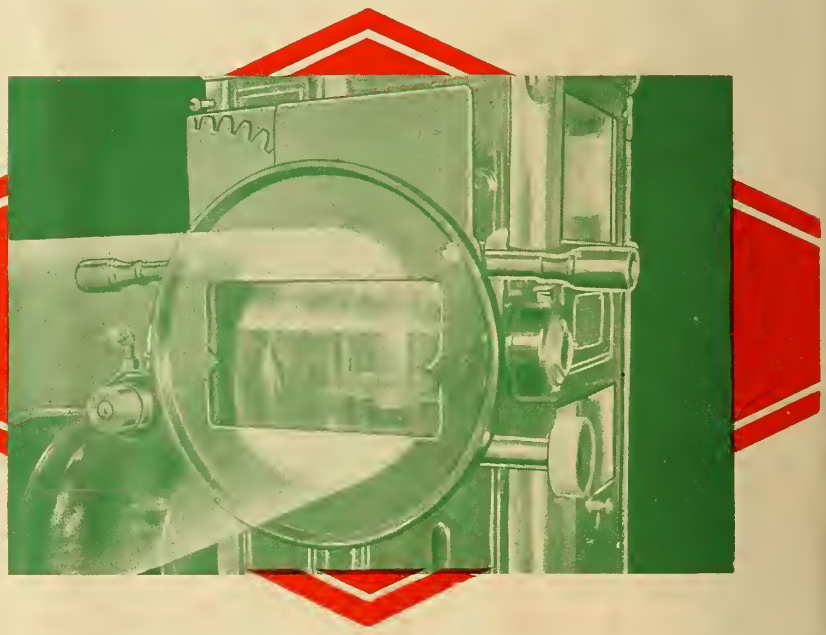
The trouble? Oh yes. It is buckling of the film over the aperture because of the heat.

THE

MODEL H MOTIOGRAPH DE LUXE PROJECTOR

IS THE CURE

THE ONLY PROJECTOR MANUFACTURED WITH A "BUILT-IN" FEATURE THAT ELIMINATES 62½% OF THE HEAT ON THE FILM



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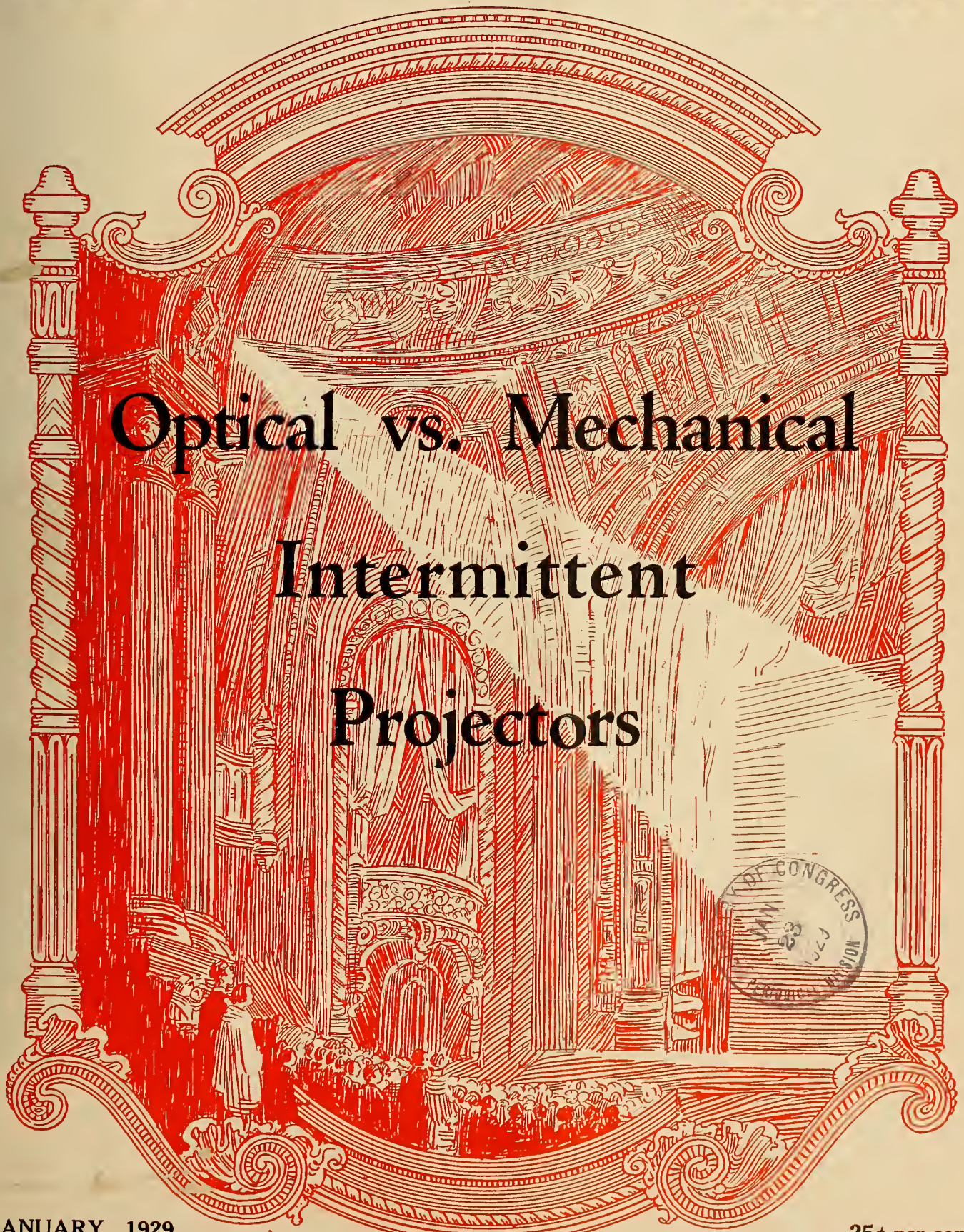
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THE MOTION PICTURE
PROJECTIONIST



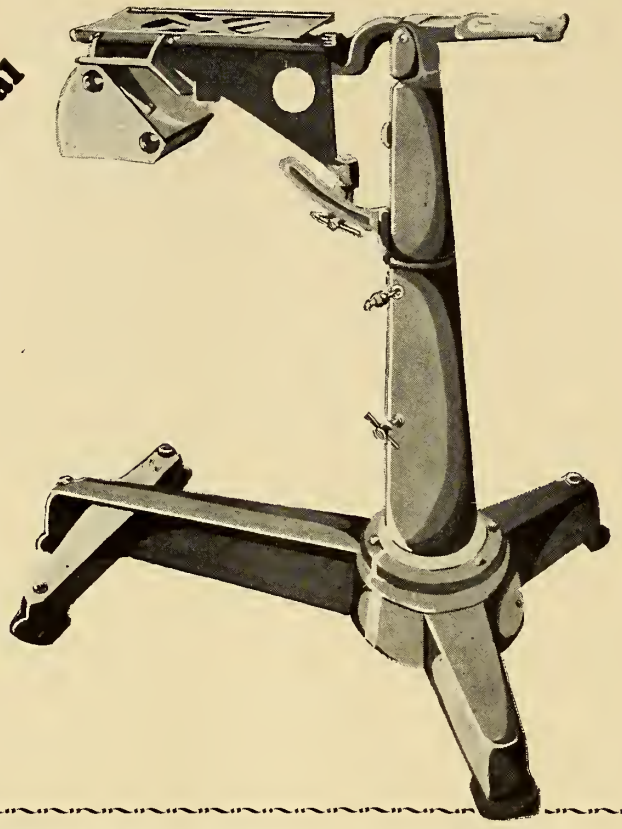
Optical vs. Mechanical Intermittent Projectors

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JANUARY, 1929

25¢ per copy

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This new pedestal has been designed and manufactured to obtain absolute rigidity, perfect balance, general durability, and eliminates vibration. It is especially suitable for Vitaphone and Movietone and other talking picture devices giving projection machines so equipped a perfect balance and poise.

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In KAPLAN SURE-FIT parts for Simplex, Projectors, you get that sound and honest quality which KAPLAN has built into SURE-FIT Parts — the quality which assures accuracy, durability, genuine and lasting satisfaction and perfect projection.

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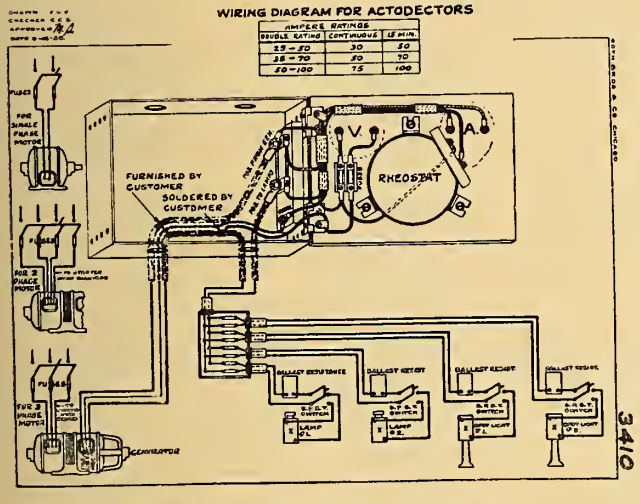
SAM KAPLAN
Manufacturer

729 SEVENTH AVENUE
NEW YORK CITY

Multiple-type Generator Advocated by Roth

MULTIPLE-TYPE generator sets are required to meet the diversified requirements of the modern projection room, it is contended by Roth Brothers & Co. (Chicago), manufacturers of Roth Actodectors, all of which are of the multiple-type, having been designed especially for projection needs. Greater operating efficiency for reflector arc lamps is possible with the multiple principle, the company declares.

The following table shows the sizes in which Actodectors are built, column 1 showing the double rating, column 2 the load that can be safely carried for 15 minutes, and column 3 showing the amperes the set will deliver continuously with a temperature rise on the windings not exceeding 40 degrees centigrade:



Wiring diagram for Roth Actodectors.

Comparative Table

Double Rating Amperes	15 Minutes Amperes	Continuous Amperes
25- 50	50	*30
35- 70	70	*50
50-100	100	*75
75-150	150	‡100
100-200	200	‡150
110-220	220	‡150
140-280	280	‡200
180-360	360	‡250
225-450	450	‡300

*Two bearings set with 50 or 60 cycle motor. Otherwise 3 or 4 bearing.
‡Four bearing sets.

With sixty cycle power supply the sets operate at 1750 r.p.m., although the larger sets can be furnished to operate at 1150 r.p.m. Sets driven by 25 arc 50 cycle motors run at 1450 r.p.m.

Ballast resistances, which are used in series with each arc, are furnished in three types:

1. A double ballast having two independent resistances in a single screen or perforated metal housing. One double ballast will take care of two arcs.

2. A single ballast resistance having a single resistance in a screen or perforated metal housing. This handles a single arc. Both the single and double ballast resistances are provided with suitable taps for current adjustment to meet arc requirements.

3. A single ballast resistance as mentioned above except that an enclosed type radial switch is mounted on the housing so that current adjustments may be made quickly and conveniently without adjusting the taps.

Because of the automatically maintained, practically constant voltage, no rheostat adjustment is necessary when striking the second arc and the changeover is made without a flicker, and there is no arc stealing, Roth officials say.



William Haines in "The Smart Set." Courtesy of Metro-Goldwyn-Mayer

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THOSE teeth! That grin! A whole theater gasps when a slender brown figure rides down a flashing field! He's safe. He's got the girl . . . ah!—that smile! Your whole theater smiles when "Bill" smiles. The audience goes home happy—sent away with a smile. National Projector Carbons keep movie smiles bright. The light that springs across National Projector Carbons is so dependable—so steady—the audience is never brought out of the land of make-believe to be made aware of mechanism behind pleasure. The most brilliant movie personality may be dulled by poor projection. Give your stars a chance—back them by backing your films with National Projector Carbon light.

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THE MOTION PICTURE PROJECTIONIST

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E. R. P. I.'s Definite Stand on Interchangeability

THE question of interchangeability of various sound picture devices seems to have been settled definitely by a statement issued recently by J. E. Otterson, president of Electrical Research Products, Inc., distributors and service agents for Movietone and Vitaphone apparatus.

For several months now the sponsors of sound devices other than those constructed under Western Electric patents have consistently stated that complete interchangeability was possible with their particular device. For quite some time E. R. P. I. proffered no answer to the various claims and counterclaims, until Otterson's recent statement stated explicitly his company's stand on the matter. Otterson's statement, issued under date of December 31st last, reads in part:

"We have just reached an understanding with the producers licensed by us that they will play their productions on any equipment which in their judgment gives results of satisfactory quality. If they find, or we demonstrate that the quality is not up to standard, then they will cease to serve such equipment.

"We will not in the interest of sales put on the market apparatus of a lower quality than the best we can build. Our first efforts will always be directed toward higher quality and this quality will never be sacrificed to lower prices. The road to higher profits in the motion picture industry lies, we believe, in this direction. * * *

"If other manufacturers can build and sell equipment as good as ours for less money, and it is equipment that does not infringe our patents, they deserve the business and will get it. * * *"

This statement would seem, therefore, to impose on both E. R. P. I. and their producer licensees the task of proving beyond a shadow of a doubt the worth, or lack of it, of any sound device running product of any Western Electric licensee.

Fight Film Mutilation

The Kansas City (Mo.) Film Board of Trade is planning an extensive campaign against mutilation of film, as a result of a sharp increase in the number of complaints within recent months. A series of letters planned by the Board will be sent to every exhibitor in the territory, and the motion picture salesmen will be asked to offer helpful suggestions.

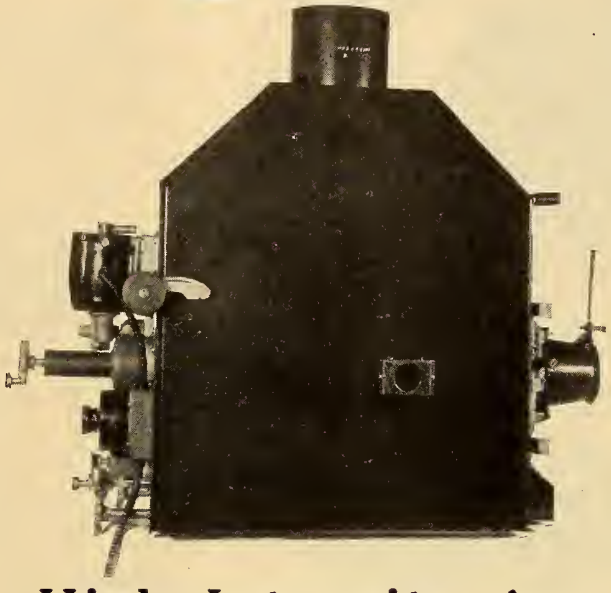
Under the terms of the contract, exhibitors must notify the exchange of a damaged print before running it; otherwise the exchange may sue the exhibitor for damages.

Notice!

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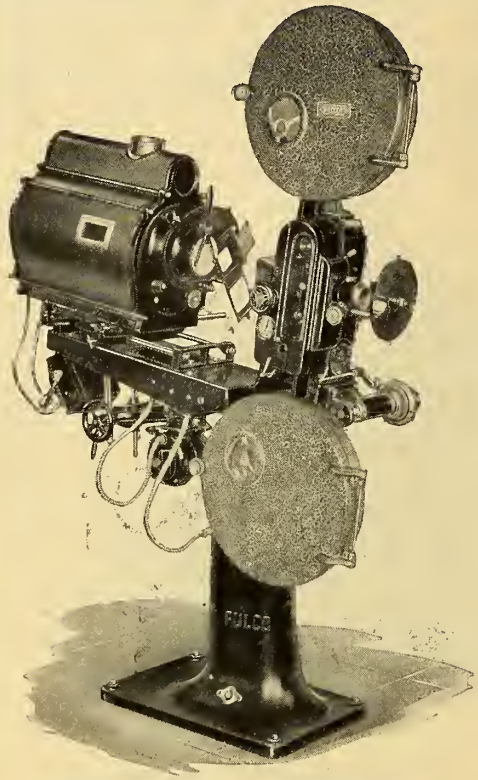


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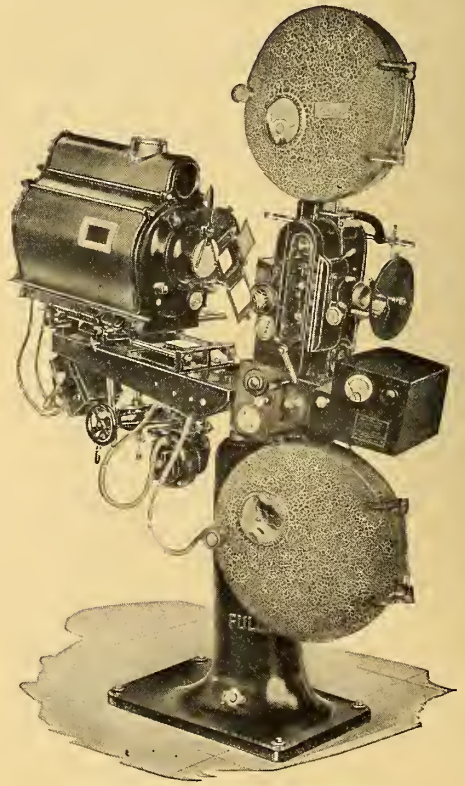
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WITH SOUND EQUIPMENT

Optical Printer for Trick Work*

By CARL LOUIS GREGORY

CINEMATOGRAPHY as practiced today has come to be a very complicated process. *The Last Laugh, Variety,* and *Metropolis,* all German made pictures started a tremendous competition among our producers. These pictures gave a new meaning to camera technique and caused a change in the methods of picture construction which are nothing less than revolutionary.

In all probability there is not a single trick or camera effect in any of the three pictures mentioned that had not already been employed by American cinematographers; yet only a few were able to discern the true inwardness of the almost continuous succession of effects and camera tricks employed in the making of these productions.

This new technique utilizes every available device of trick photography, not as a thing in itself, but with a very definite idea of the emotional and psychological reaction which will result from the employment of the proper photographic effect.

Trick photography as employed today deserves a better term to define it. *Special process photography* is another term which is sometimes used but it, too, fails to define properly the scope of the photographic fabrications by which the motion picture ascends from mere factual representation into pure imagination.

This fanciful product is fashioned by dissecting the component parts from various pictured realities and then recreating an imaginative result from the dissected parts. It sounds difficult and it is difficult. As a concrete example the director wishes to show a mermaid, an imaginary creature half woman and half fish. He wishes to show this creature in action as he imagines it and not as a Mack Sennett extra girl with legs laced into a property fish tail.

The "Trick" Process

Give the special process photographer the time and money and he will make negatives of a nude woman swimmer and of a shark or a minnow and from these he will dissect the trunk of the woman and the tail of the fish and assemble a mermaid that will almost make you believe in the existence of the fabled creatures. It is manifest that a task of this kind is practically impossible without mechanical and optical aid of great precision.

Most "trick" work consists of an assembly or composite of time and action components. In animation the components are painstakingly drawn by hand and synthesized by photographing them in the proper sequence with a motion camera.

With the development of the art of cartooning and of camera trick work the optical printer came into use as an ideal instrument for selecting from films already made the components desired for the construction of composite or "trick" pictures, and for the recombining of these components into new pictures.

The requisite components for an infinite variety of new combinations exists in every collection of motion picture film but to select these components from hundreds or thousands of film pictures seems too staggering to attempt. This selection is only a half of the problem, for the components must then be reassembled with a mathematical precision so fine that the new combinations shall not reveal the joining lines between the welded parts even when magnified hundreds of diameters on the screen. The solution of this difficult problem is in a precision optical printer where every mechanical move can be controlled with micrometric precision.

A Recent Development

There is nothing secret about the principles of optical printing. They are known to every motion picture technician. A number of optical printers have been constructed for exclusive or private use but the details of their mechanical design have been kept more or less in seclusion.

Realizing that there are many firms and individuals who have use for the product of such a machine and that the very few elaborate optical printers in existence are being kept for exclusive purposes, Mr. Fred A. Barber has constructed one of these instruments for the service of the public.

The base of the machine is a heavy six-foot lathe bed set on a concrete foundation. Sliding on the lathe bed which acts as an optical bench are three heads. The operator sits at one end of the machine where all of the controls ordinarily used are situated. On the head nearest the operator is a Bell & Howell camera with special magazines which takes up automatically either backward or forward. The second head has an interchangeable mount and takes any lens fitted for the Bell & Howell camera. The third head carries a special projection head movement and lamphouse.

All of the heads may be shifted up and down or sideways and micrometric indicators reading in plain figures to one eight-hundredth of an inch show the exact position of each member.

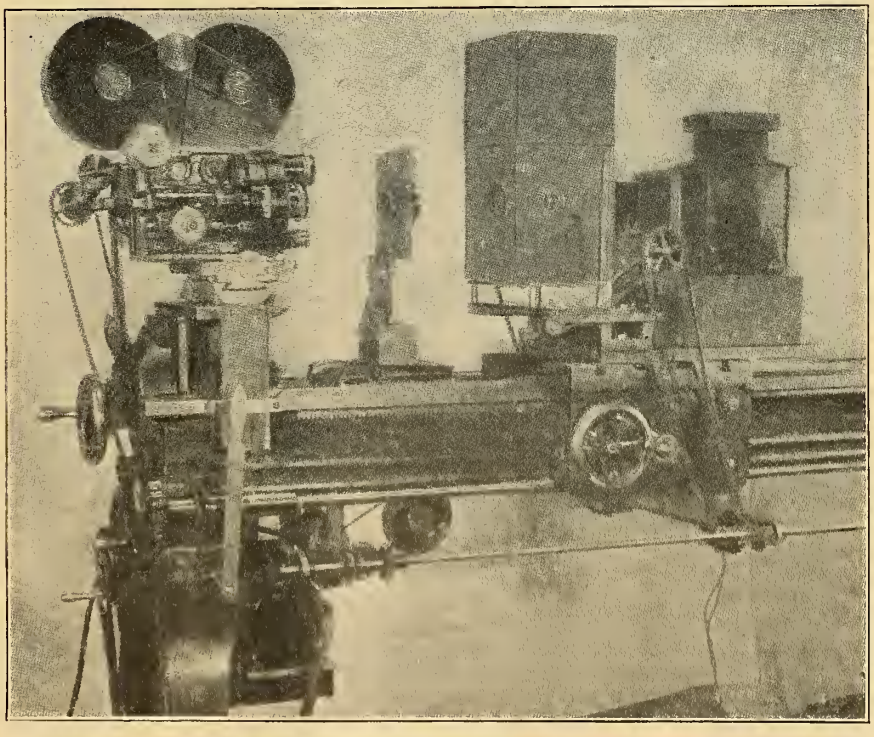
A motor beneath the machine permits either head to run independent of the other and either head may be run backward or forward. Several interchangeable mechanisms may be used on the different heads for different purposes including enlarging from and reducing to 16 mm. size film.

Variety of Work Possible

So many different things can be done with this machine that it is not possible to list them here. Listed below are some of the principal things which can be done with it:

1. Duplicate negatives can be made which are not distinguishable from originals as no printer marks show on these negatives.
2. Duplicate negatives can be made from

(*Continued on page* 16)



Optical printer, with special Bell & Howell camera, interchangeable lens head and lamphouse on third head.

* S.M.P.E. Trans., Vol. XII, No. 34.

Optical vs. Mechanical Intermittent Projector

A discussion of the advantages or disadvantages of the respective types of projectors, with both arguments being very ably presented by the proponents of each

for the Mechanical Intermittent

LESTER BOWEN *and* HERBERT GRIFFIN *

THE title of the paper which I am about to read—"Is the Continuous Projector Commercially Practical?" was suggested to Mr. Bowen and myself by the extremely large number of inquiries we have received and the great number of statements which have been made during the past few years regarding the practical possibilities of a continuous projector.

Mr. Bowen and I have been rather fortunate in that we have had a fair amount of practical experience in connection with the continuous projector developments, as we have had models of apparatus of this type in our factory for test and have seen tests conducted outside our factory, which have led us to the general conclusion in this paper.

Generally speaking, the continuous projector has been regarded as any mechanism through which the film passes continuously at a varying speed depending upon the action pictured, and in which the light ray is manipulated in such a way as to render the film image stationary on the screen.

There are several ways of accomplishing this result by employing different constructions which can be classified in two groups, as follows:

The Various Mechanisms

First: Those mechanisms employing a rocker reflector by means of which the light ray is rocked sufficiently to cause the image to be projected stationary on the screen.

Second: Those mechanisms which employ revolving lenses or prisms by means of which the light ray is bent or displaced sufficiently to render the image stationary on the screen.

The first group can be divided into two classes, the first class containing those mechanisms which employ an oscillating reflector which follows one film picture in its downward movement, the light ray rocking in synchronism with the movement of the film sufficiently to render the film image stationary on the screen, and returning rapidly to pick up the next film picture and repeat the process.

The second class containing those mechanisms which employ rocking reflectors which alternately pick up the successive film pictures following them in their downward movement and by rocking the light ray in synchronism with the film movement, superimpose the images of the successive film pictures on the screen in a stationary position.

The second group can also be divided into two classes. The first class containing those mechanisms which employ revolving prismatic rings or lenses which successively at each revolution pick up the film picture following it in its downward movement, and which by bending or displacing the light ray in synchronism with the film movement, cause the image of the film picture to be projected in a stationary position on the screen, and which repeat this action for each successive picture at each revolution.

The second class contains those mechanisms which employ a series of revolving prisms or lenses which alternately pick up the successive film pictures and follow them in their downward movement and which by bending or displacing the light ray in synchronism with the film movement, superimpose the film images on the screen in a stationary position.

The various types of continuous projectors have been classified in the above description in order that the action of the different mechanisms may be clearly understood and in order that certain types or mechanisms can be referred to without the necessity of lengthy description.

Illumination

If we analyze the claim that the continuous projector will transmit to the screen a greater proportion of light (assuming the same light source and the most efficient optical system in each case), than the intermittent projector, it is apparent that this claim is an exaggeration and that the continuous projector will not transmit as much light as the intermittent projector.

The truth of this statement will be readily realized if we consider that in the case of the optical projector the spot of light at the aperture must be sufficiently large to cover two film pictures in height. To do this without discoloration in the corners requires a spot approximately 2¼" in diameter, having an area of approximately five square inches, of which area less than ¾ of one square inch is available for transmitting to the screen. This means that less than 15% of the total light at the spot can be used.

Now compare this condition with the intermittent projector, having a spot approximately 1½" in diameter with an area of approximately 1 square inch, of which ¾ of one square inch is available for transmitting to the screen, or approximately 43%. Deducting 40% of this, which is approximately the amount of light cut by the revolving shutter, we have left approximately 25% of the total light at the spot available for transmitting to the screen, or a proportion of 3 to 5 in favor of the intermittent projector. It is doubtful if this condition can be improved in the continuous projector by distorting the spot into an oblong shape for the reason that the light loss in the optical system necessary to accomplish this would more than equal the gain in reduced spot area.

Steadiness

The foregoing is the condition which exists in the continuous projector before the light passes through the film aperture and does not take account of the light loss which is inevitable in the optical system (exclusive of the projection lens), whether this system is reflectors, prisms, or lenses. This loss is considerable and is not at all present in the intermittent projector.

Considering the continuous projector from the standpoint of steadiness of screen image as compared with the steadiness of image possible with the intermittent projector, it is apparent that the continuous projectors which are included in group

* "Is the Continuous Projector Commercially Practical?"—S. M. P. E. Trans. No. 18, 1924.

1 can never equal the intermittent projector in this respect.

In the type of mechanism in group 1 the intermittent movement has simply been transferred from the film to other parts of the mechanism which are much heavier and which it is impossible to move with the same accuracy that is possible when the film is moved intermittently as it is in the intermittent projector.

The continuous projectors which are included in group 2 present an entirely different condition, for the reason that in these mechanisms there are no oscillating or intermittently moving parts, the steadiness of the image depending entirely upon the accuracy of the lenses or prisms and the exactness with which they are mounted.

Commercial Possibilities

Included in group 2 there are mechanisms employing prisms or lenses that can be manufactured commercially and which should transmit an image registering to within 1/8 of an inch on a screen at 100 feet. This is true, of course, for each individual prism only. When a series of prisms is employed it is the accuracy of mounting which determines the degree of exactness to which the successive pictures can be caused to register on the screen.

The mounting of a series of prisms with the precision necessary to make the continuous projector practical will be found to be a very difficult problem and one which can only be accomplished optically. It is not reasonable to believe that a mechanism adjustment can be made which would be accurate enough for this purpose. It is plain to anyone familiar with these problems that a projector of this kind would be very costly to manufacture, and that by insuring the most accurate prism mounting possible, it would not be possible to exceed the accuracy of registration which is easily secured with the intermittent projector as manufactured at present.

Definition

The continuous projector can never be expected to equal the definition in screen image which can be secured with the intermittent projector, for the reason that any lens, prism or reflector which is interposed either between the film and projection lens, or between the lens and screen, will detract from the definition of the image to a certain extent—depending upon the accuracy of the lens, prism, or reflector, and upon the number of surfaces, in addition to the projection lens, which the light must meet or pass through on its path to the screen.

The question of definition is and has from the first been one of the most difficult problems to overcome in the development of the continuous projector. This will always be so, for the reason that any optical elements used must be highly corrected for aberration, both chromatic and spherical, and must also provide a light path which is optically the same length at any point of the film travel.

It might be well to note here that the question of cleanliness will have a great bearing on the definition of the screen image, and in a projector employing a great number of optical elements having exposed glass surfaces which must be kept clean, this is a very serious problem. A mechanism of this kind would produce a very poor picture if not at all times kept in a perfectly clean condition. This is also true of mechanisms employing surface reflectors, which are very hard to keep in condition and which can easily be seriously damaged if not properly cleaned.

Quietness

There can be no question regarding the quietness in operation of the continuous projector if constructed as are those mechanisms referred to in group 2, for in this type every part is operated with a rotary motion making possible a high speed of movement without vibration or any of the objectionable noises which are noticeable in intermittent projectors.

Film Economy

One of the principal reasons for the efforts which are being made to perfect the continuous projector is the great saving in film which is possible with this type. It is evident that if the film can be run continuously through the projector without the strain of the intermittent movement, that its life will be greatly increased. This saving, however, is not as great as has been claimed, for the reason that a large part of the film damage is now caused in rewinding and not in the projector.

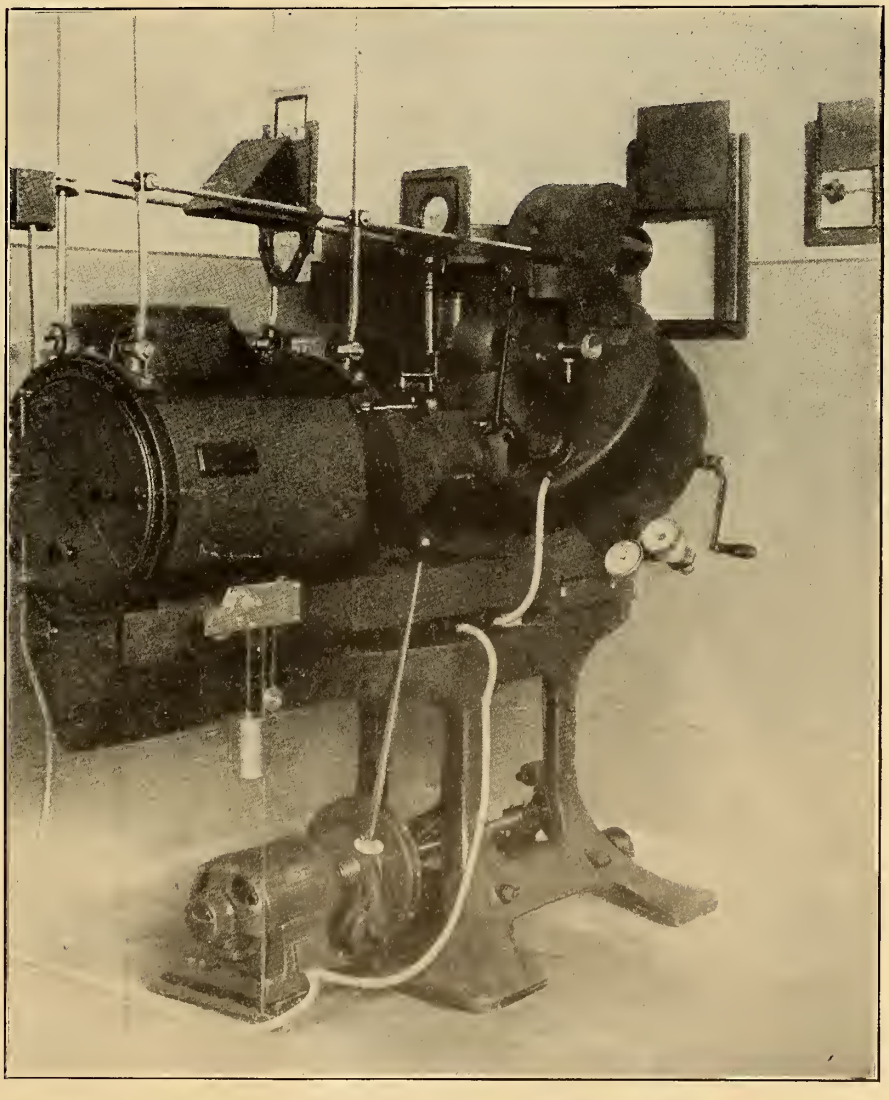
In the continuous projector it has been found very difficult to provide a film aperture which will mask the picture top and bottom. There have been several different attempts made to construct an aperture which will mask the picture satisfactorily, but it has not been found possible without a great loss in illumination on the screen. The effect of the absence of an aperture is to cause the picture to appear on the screen together with a part of each adjoining picture above and below.

A condition of this kind would, of course, be strongly objected to in a theatre. The effect has to a certain extent been overcome by setting up a mask in front of the projector. This, however, is unsatisfactory, for the reason that the mask is not in focus and, therefore, cannot mask the picture sharply. The mask will either extend inside the picture, thereby damaging the definition, or will allow the picture to extend beyond the frame line.

It may be of interest to briefly outline the qualities which the continuous projector should possess to make it commercially practical:

All parts should have a rotary motion.

(Continued on next page)



View of the Mechau (continuous type) projector as it looks when set up ready to run

The optical system (no matter of what design), should be a single cycle system. By this it is meant that the same optical elements should be employed in projecting each successive picture.

The light path should be optically the same length from film to screen at every point of film travel.

The optical elements used should be sufficiently corrected as to project a picture free from noticeable distortion or color fringe.

A film aperture should be provided which will sharply mask the picture on all sides.

The projector should transmit to the screen at least as much light as the intermittent projector, using a light source of the same value.

for the Optical Intermittent — —

J. F. LEVENTHAL*

NEWCOMERS in the technical branch of the motion picture industry are usually unfavorably impressed with the intermittent movement of the projectors in universal use. It has been said that nature abhors a vacuum, and it may similarly be said that the mind of the mechanical engineer abhors an intermittent movement.

In the projection machine of today, the visiting engineer finds a mechanism of steel feeding a fragile ribbon of celluloid by imparting rapid jerks applied through unyielding sprockets meshing with perforations in the celluloid. It requires no great perspicacity to see that an arrangement of this kind must lead to trouble of various kinds, and most of you will agree with the writer when he says that the intermittent movement constitutes a great hindrance to the simplification of projection apparatus.

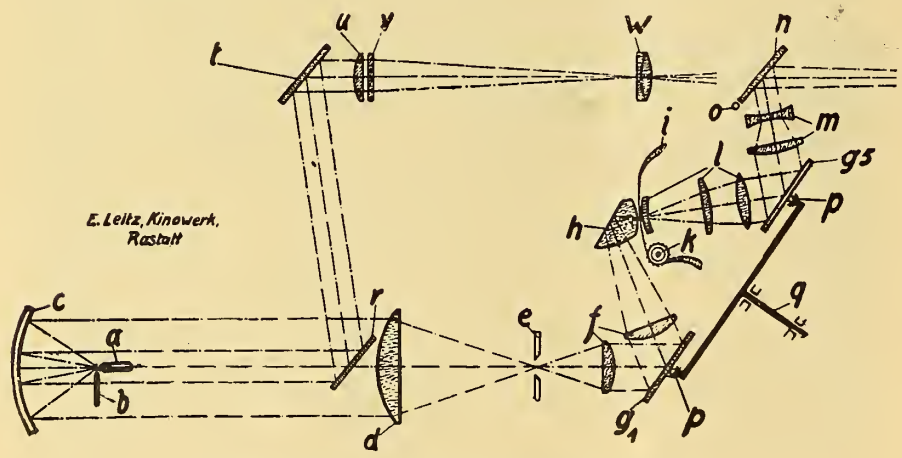
With the introduction of talking picture apparatus a move in the direction of simplicity will undoubtedly be made and it is the thought of this writer that it is the duty of the industry to study and to encourage development in the field of optical intermittent projectors with the idea of eliminating as much of the existing troubles as possible.

Optical Intermittency Ideal

The basic principle of motion pictures is intermittency. If a mechanical intermittent is not used, then an optical intermittent must be used. In other words, if the picture itself is not brought to rest, then the image-forming rays of light from the picture must be brought to rest. If the light can be brought to perfect rest, producing a stationary screen image from the moving picture, then the film can pass uninterruptedly through the aperture. This constitutes the ideal condition.

A paper on this subject was read at the Roscoe meeting of the S. M. P. E. in 1924, and a number of conclusions were reached by the writers of the paper which may have been justified at that time, but which, in the light of recent developments in this field, will bear further scrutiny. In analyzing the points mentioned, the writer will find it necessary to refer to an existing projector of the optical intermittent type—the Mechau projector (a German product)—and wishes it understood that he holds no brief for Mechau, nor is he connected in any way with the development or sale of this machine.

The first objection raised in the 1924 paper, under the heading of "Illumination," is that it is necessary, in a machine of the character under discussion, to illuminate a two-picture area. To do this a much larger spot is required, and it is pointed out that as a consequence only 15 per cent of the usual illumination at the aperture is available. It is not necessary to illuminate a two-picture area, and this is proved in the Mechau machine, where only a one-picture area is illuminated; and the spot, instead of standing still, moves with the picture that is being exhibited. Under such conditions, the efficiency at this point is approximately the same as in the present day projectors.



Path of light rays in the Mechau Projector

a. Positive carbon.
b. Negative carbon.
c. Concave mirror
d. Condenser.
e. Aperture.
f. Lens.
g. One of the sector mirrors rocking on (p) and projecting rays from aperture in synchronism with passage of film.
g^5. Sector mirror on (p) and dissolving movement of film pictures (the "optical dissolve").
h. Prism.
i. Film.
k. Sprocket.
l. Projection lens.
m. Objective lens for enlarging size of picture.
n. Projection mirror.
o. Axis of this mirror.
q. Axis of sector mirrors.
r. Mirror for slide projection (adjustable).
t. Mirror
u Lens.
v. Slide.
w. Objective lens.

Loss of Light

A second point under the same heading is that the optical parts necessary to bring the picture to a stationary position on the screen will cause light loss. This is true, but this loss compares favorably with the loss due to the shutter blades in the present machines.

Under the heading of "Steadiness," it is pointed out that if the optical parts are not carefully mounted, the picture on the screen will be unsteady. This is true, but the writer, for one, feels that this is no insurmountable obstacle. An advantage is that (at least in the rotating type of continuous projectors), once the parts are correctly set they will remain so indefinitely. The present intermittent machines give a steady picture when all conditions are right; but conditions are not always right, and a thoroughly steady picture is a rarity. The abnormal wear in the intermittent mechanism is not conducive to a constantly satisfactory result in this direction.

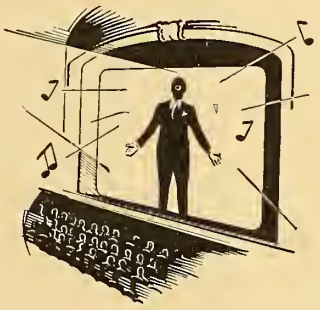
Under the heading of "Definition," the writers say that additional optical parts over the present objective lens tend to de-

* "Projectors with Optical Intermittents"—S. M. P. E. Trans., Vol. XII, No. 34.

(*Continued on page* 20)

1 manufacturer
11 producers
1000 exhibitors

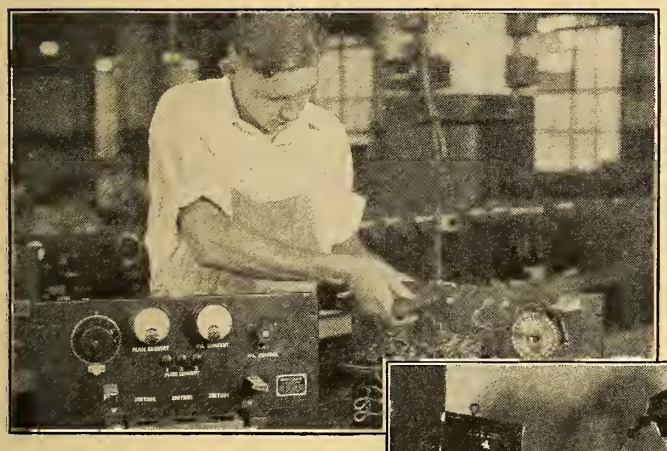
making Sound Pictures a success



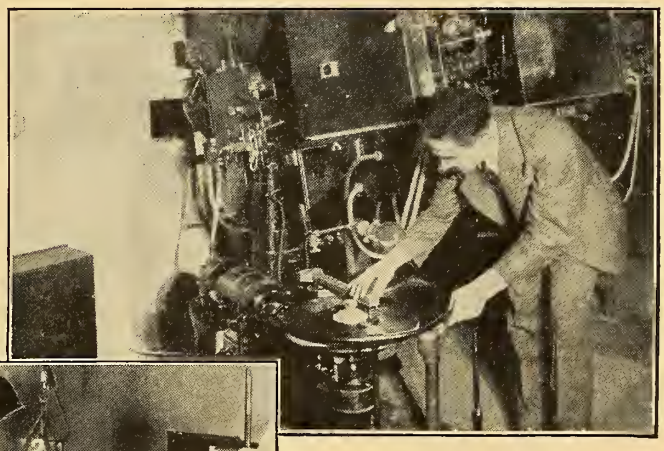
WORKING shoulder to shoulder they have pioneered a new art to its present position as an outstanding box-office success.

Western Electric, the manufacturer who developed the only Sound Picture equipment in considerable use today, pledges a continuance of high electrical and mechanical standards and announces a rapid step-ping-up of output to meet the pressing demand.

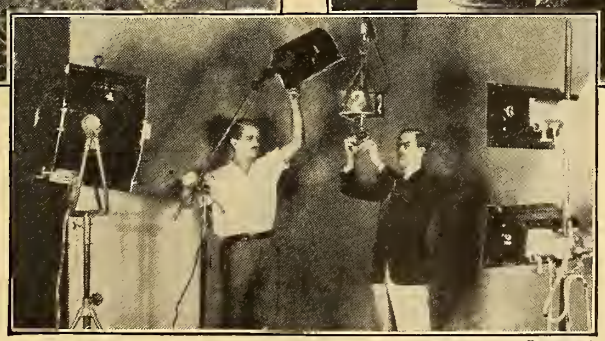
The Producer, naturally jealous of the quality of his Sound Picture releases, and the Exhibitor, who knows the popularity of his house is closely linked with a Sound Picture installation of high quality, will continue to look to the experience, the reputation and the organization of Western Electric.



Western Electric
made the first successful Sound Picture recording and reproducing equipment.



Exhibitors
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As The EDITOR *Sees* IT

¶*The Bad Film Problem*

IT was expected that with the advent of sound pictures, not to mention the constant stressing of the necessity for keeping the film free from mutilation and the wide publicity given the need for extremely careful handling of sound film, that the old changeover mark nuisance and the careless handling of film would be a thing of the past —or at least occur so seldom as to indicate that the craft at large had determined to rid itself of one of its prize bugaboos. But not so. For the number of complaints on the score of damaged film resulting from careless handling by projectionists has grown instead of decreasing. From every section of the country come complaints of the marking, punching and scratching of film, with or without sound accompaniment.

Mutilating silent film was bad enough and did enough to bring the craft into disfavor; but now that sound film is being treated with equal, if not more, indifference on the part of projectionists, the problem has become acute. The number of samples of really bad film and letters of complaint from practically every section of the country continue to pile up in this office, and the chances are that not even a small fraction of the abuses are reported. With the announcement some months back of the establishment of a Complaint Department of this publication as a service to projectionists who were sincerely interested in the problem of bettering film conditions, there developed a situation that proved conclusively to our mind that the matter was not one to be settled by merely publishing this or that particular grievance and then making a report on each individual case to the home office of the producer of the film in question. The response to our offer to be of service to projectionists in tracking down the cause of improper handling of film was so overwhelming as to definitely establish the fact that this, surely, was not the way to handle the problem.

¶*Sporadic "Conferences" Useless*

IT would not be fair to say that all projectionists engage in these shiftless tactics, for a goodly portion of the complaints are from projectionists themselves who have to use film after it has been abused on a prior run. As an indication that many, many projectionists are earnestly trying to better film conditions this news is cheering; but it is unlikely that cheering news alone will suffice to curb the activities of those who continue to project in the 1910 manner. There is no disputing the fact that the quality work done by the average projectionist today has at least kept step with the progress of projection standards—that is, in the matter of better equipment and improved technique; but it is apparent that the lazy, shiftless type of man will be with us always.

Often the matter of introducing to the industry a compulsory standardization for changeovers has come up for consideration. These proposals often carried a rider stipulating that the slightest deviation from the standard agreed upon was to be followed by summary penalizing in one form or another. It is sad to record the fact that such proposals were short-lived and hardly were given a thought after the adjournment of this, that or the other "conference." A truly representative conference of the leaders in projectionist ranks probably would be productive of fine results in the way of improving projection technique, but the complacency of the leaders throughout the country to continue to mull along each in his own little sphere would provide formidable opposition to such a plan.

Every now and then a certain Local Union appoints a committee to consider this or that phase of projection work. The committee finishes its work, makes its report, which is given publicity in these columns or elsewhere, and then the matter is promptly forgotten by everybody concerned. Work such as was accomplished recently by the committee of Local 199 (Detroit) is the type of work which really means something. Other and half-hearted discussions of projection problems which occurred within the past year were so much wasted effort.

¶*The Local Unions' Power*

ONE of our correspondents states that several times of late he has received film in such poor condition that it was impossible to run it under any circumstances. Before this print could be replaced the theatre in question had been caused severe inconvenience in loss of prestige and actual loss in money in refunds. It is too bad to have to admit that often projectionists are forced to "nurse" a poor print along through several shows simply because the show must go on. On the other hand, the forced cancellation of a few programs, with the consequent loss of revenue at the box office, would seem to be about the only method left by which to awaken the sleeping beauty producers and exhibitors to the gravity of the problem and the necessity for dealing with it at once.

Those projectionists who have their own "pet" gadgets for changing over are, in the main, men who have cast about for a safe method of changing over without having to mutilate the film. These men are not included in the group from whom damaged film may be expected. Rather is it the lazy, incompetent projectionists who must be so restricted by set rules that his hacking proclivities may once and for all be banished.

This brings up the question of responsibility for damaged film. When film is damaged, the manager blames the projectionist, who in turn blames the exchange, which in turn blames the projectionist on a prior run. Altogether a vicious circle.

The possibility of dealing properly with the situation seems very remote if cooperation is not had from every Local Union in enforcing whatever method seems to them best applicable to the problem—that is, enforcing the right of their members to absolutely refuse to run poor film as well as executing the proper penalty upon any man who is responsible for mutilation.

Waiting for assistance from the owner or manager, or the producer, has been tried not wisely but too long, and it is time that pressure from another source be applied. The power to push such sorely needed reforms lies in the individual Local Unions acting in concert and insisting upon the right of their men to be given every opportunity to put on the best show possible, no less than the right of every theatregoer to get full entertainment value for the cash he puts down at the box office.

Proper Screen Selection

By R. E. FARNHAM
Engineering Department, National Lamp Works of General Electric Co.

THEATRE owners and managers, anxious to give their patrons maximum enjoyment and comfort, choose with great care the decorations, chairs, ventilation and heating equipment, projectors and other appointments of their theatres, and then buy the screen with little or no thought of its effect on the projected picture. The selection of a screen is frequently made entirely on the basis of price, and unfortunately many theatres have screens whose characteristics are not at all suited to their shape and size because of this practice.

For the most efficient projection of a satisfactory picture a screen must be selected whose size and light distribution characteristics are such that it will most effectively direct the light to the audience so that the images there formed may be seen without effort from every seat.

A good rule to determine the picture or screen width is as follows: The minimum picture width should not be less than about one-seventh the distance from the screen to the most remote seat, and the maximum picture width is such that the angle formed by lines connecting the two sides of the picture and the eye of an observer in the first row does not exceed approximately forty-five degrees.

The Two Extremes

If the minimum requirement is exceeded, there will be such a concentration of detail that patrons seated in the rear of the house will have difficulty seeing clearly. Exceeding the maximum stipulation will make it necessary for those in the front rows to move their heads to scan the entire picture. The height of the screen is three-fourths its width, except in cases of picture distortion due to fault location of the projection room.

The shape and seat arrangement of a theater govern the choice of screen surface. It is, of course, always desirable that the screen have a high reflection factor, but it is even more important that it direct a maximum part of the light back within the solid angle in which are included all of the seats, and that the light be so distributed within this angle that the screen will appear, as nearly as possible, equally illuminated from all of the seats. In the wide theatres the outer seats in front often make an angle of 60 degrees with a normal to the screen; in the narrower houses the angle is sometimes as low as 30 degrees, as shown in Fig. 2; in the vertical plane the lowest front seats are occasionally as much as 35 degrees below a normal to the screen, and the highest seats 30 degrees above it.

The distribution of light from a screen surface can be controlled by choice of material, its finish, texture and configuration. The screens at present available

WHAT with the havoc wrought by the advent of sound pictures, with the placing of the horns behind the screen and the resultant loss of screen efficiency, any discussion of screen values at present must necessarily presuppose that the future will witness the development of sound equipment to a point where screen quality will resume its rightful place of importance in the general projection scheme.

Withal, the accompanying article is the result of painstaking research into comparative screen values and contains much of interest and value to projectionists.

may be classified in three groups, depending on the nature of their light-reflecting properties.

A screen typical of each group is illustrated in Fig. 3, together with curves indicating the relative brightness as viewed from the different angles when a unit quantity of light is directed in a beam normal to the screen. Thus at right angles to the surface, the mat-diffusing screen has a brightness of 1.0 unit, and this is maintained at 0.94 units at 30 degrees from the normal, and falls only to 0.9 at 60 degrees; the semi-mat metallic surface, on the other hand, has a brightness of 3.5 units at right angles to the screen, but at 30 degrees it is reduced to 0.8 units, and at 60 degrees it is only 0.25 units. It should be noted that the areas included within the several curves are not at all proportional to the amount of light reflected from each screen.

Diffusing Surfaces

Since with the mat-diffusing surface shown in Fig. 2A, the maximum brightness is well maintained at all angles, a screen of this characteristic is especially adapted to very wide theatres, such as that shown in Fig. 3. Although the outside front seats lie 65 degrees from the normal, the brightness in their direction is about

(*Continued on page* 15)

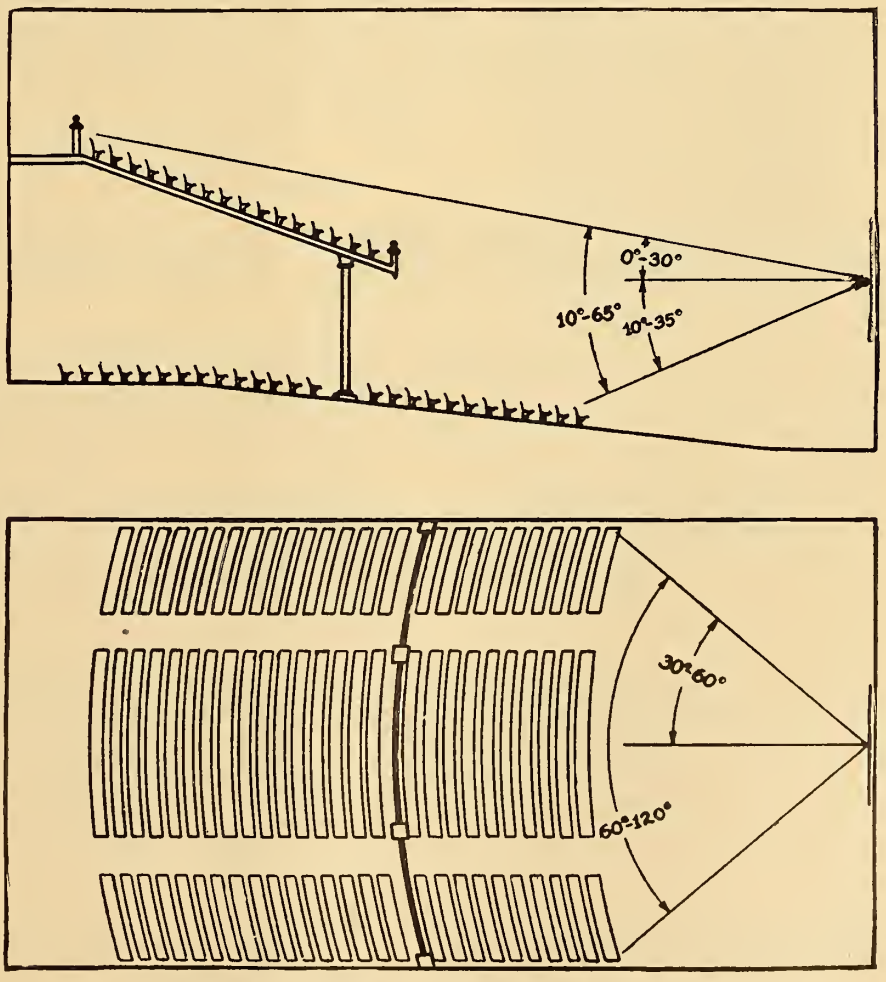


Fig. 1—Representative angles within which the screen must direct light to the observers

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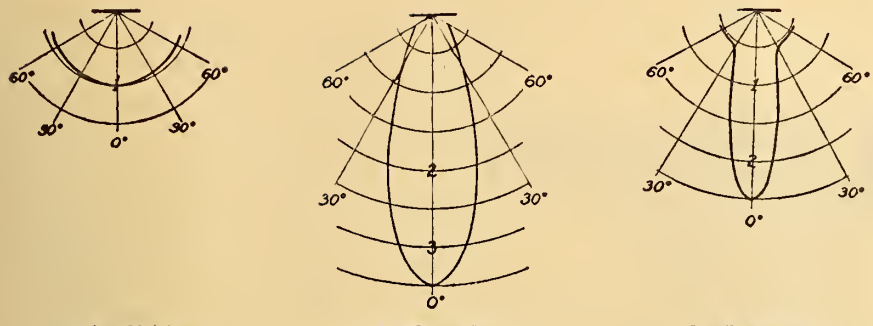
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A—White Diffusing Surface **B—Semi-Mat Metallized Surface** **C—Beaded Surface**

Fig. 2—Three representative screen surfaces and brightness distributions when equal quantities of light are directed in beams normal to the surface.

Proper Screen Selection

(*Continued from page* 13)

90 per cent, and the average brightness for all of the seats is 96 per cent of the maximum. In general, the diffusing surfaces should be used where a considerable portion of the seats lie more than 40 degrees from the normal to the screen.

The smooth metallized surface, Fig. 2B, is especially applicable for the narrower houses, such as the one shown in Fig. 4. There the front end seats are about 40 degrees from the normal, but 97 per cent are within 30 degrees, at which angle the brightness is still 0.8 units, and 87 per cent are within 20 degrees, where the value is 1.6 units. The average screen brightness, as viewed from the seats of this theater, will therefore, with this type of screen, be 2¾ times what it would be with the diffusing type.

The more usual case is that of the theatre of medium width, shown in Fig. 5, where the end front seats make an angle of 50 degrees with the normal. But even here 88 per cent of the seats fall within 30 degrees of the normal, and all of these seats receive more light from screen B than from Screen A; in fact, about 2½ times as much for the average. For the remaining 12 per cent the screen appears only about one-half as bright as would one of the diffusing type.

The beaded surface, C, Fig. 2, has a somewhat lower maximum brightness than the semi-mat metallic surface, but higher values at angles of about 35 degrees and beyond. The brightness of the diffusing screen, on the other hand, is somewhat higher at all angles beyond 20 degrees. The beaded surface finds its best application in theatres of medium width. In the house shown in Fig. 7, 71 per cent of the seats fall within 20 degrees of the normal, and these will receive about twice the brightness that would be directed from screen A, but in the directions of the remaining 29 per cent the average brightness will be only 60 per cent as much as that obtained from A.

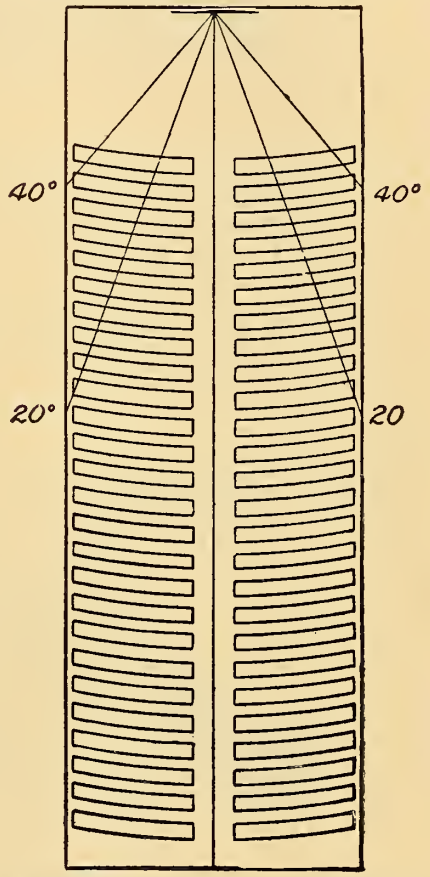


Fig. 4—Eighty-seven per cent of the seats in this narrow theatre fall within 20 degrees of a normal to the screen. The average brightness of a semi-mat metallized screen surface as viewed from this audience will be 2¾ times that obtained with a diffusing screen.

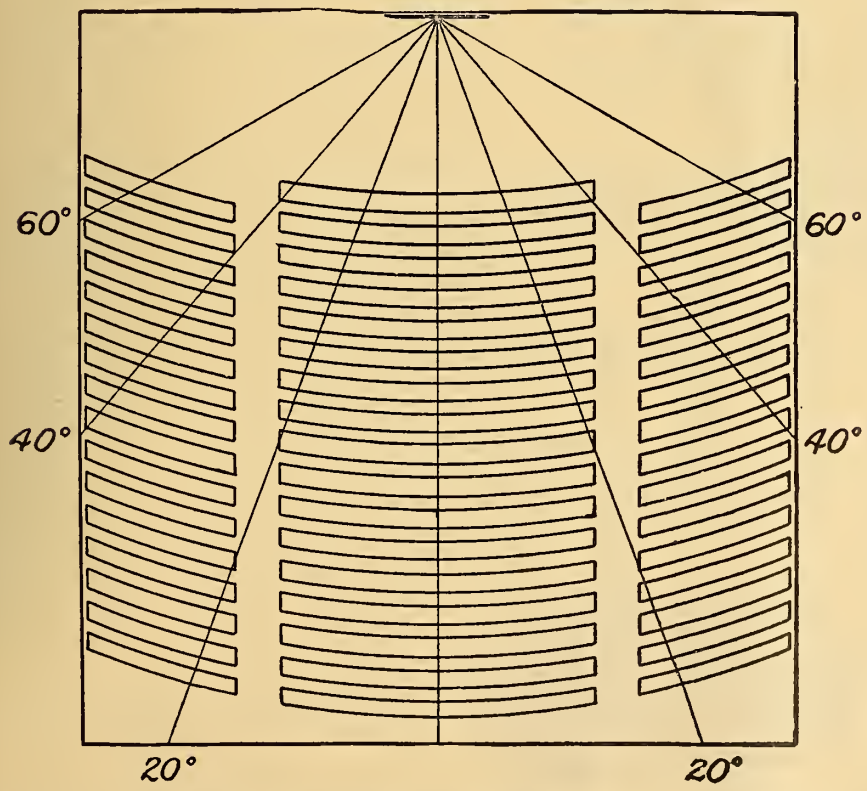


Fig. 3—In a wide theatre the diffusing screen appears practically equally bright from almost all the seats.

In the foregoing, reference has been made only to the light distribution in the horizontal plane, but since the seats are at various elevations the brightness distribution in the vertical plane must also be considered. This is especially important, in view of the fact that the three types of screen surfaces act differently in reflecting the light received at an angle with a normal to the surface. From the metallic surface screens, for example, the reflection is to a considerable extent specular, as from a mirror; that is, the general direction of the reflected beam makes an angle

(*Continued on page* 22)

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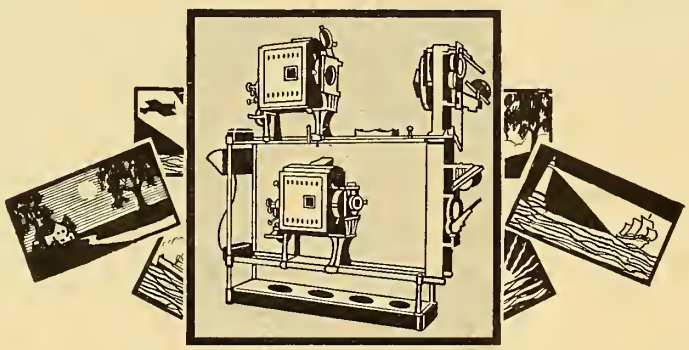
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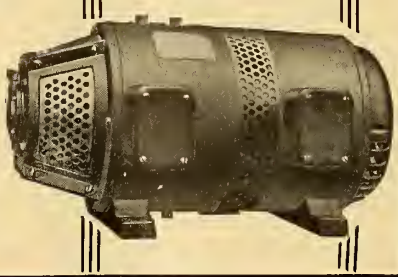
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Optical Printer for Trick Photography

(*Continued from page 7*)

non-standard negatives or prints and the frame line changed as desired.

3. Two or more negatives can be combined upon one film so that normal and ultra-speed may be shown side by side or a vision may be made from one negative and introduced into any other negative.

4. Negatives can be reproduced with the action slowed down or quickened to almost any extent. Normal action can be made from ultra-speed, thus giving normal and ultra-speed action from exactly the same view point.

5. Action can be suspended and held still at any point in the film and then continued, reversed, or repeated. This feature is very valuable for golf instruction films or for instruction in any other sport or for showing the action of machinery.

6. Any negative can be reversed to show the action backward, and this action can be slowed down or speeded up if desired.

7. Action can be repeated as many times as is required, and at the same time, reversed or the speed changed to suit any purpose.

8. All kinds of camera effects such as: fade-in, fade-out, iris-in, iris-out, lap dissolves of any length, or any other camera effect can be introduced onto negatives already taken.

9. Duplicate or multiple action of the same subject can be made to appear in the same scene. This can be in synchronism or different phases of the same action may be shown going on at the same time.

10. Double and multiple exposures from any number of original negatives can be made in absolute register.

11. Super-imposed titles may be made in any portion of a negative which has already been taken and developed.

12. Borders, frames, and masks may be introduced around any scene.

13. Close-ups can be made from semi-close-ups. Any part of any negative already taken can be enlarged or reduced.

14. The effect of moving up on a scene for a closer view or moving back to include more of the scene can be made from one negative already taken.

15. X-ray views of machinery or any object in motion can be made showing both exterior and interior as if the machine were transparent.

16. Explanatory labels, animated lines, pointers, etc., can be introduced into negatives already made.

The effects enumerated above do not by any means tell all of the things which can be done by the various possible manipulations of the machine. The various combinations possible are limited only by the ingenuity of the operator and the film material which he has available for reproducing ideas.

Following the presentation of this paper, members of the Society engaged in the following discussion:

Discussion

Mr. Fear: I designed an optical printer a number of years ago, and the difficulties

Suggest Year's B. O. Test on All Sound Films

With Hollywood studios working 24 hours a day turning out sound pictures, discussion of the need for a 12-month box office check on receipt for all classes of pictures is needed, according to several leading producers on the West Coast. Despite the tremendous grosses being rolled up all over the country on sound pictures, several leaders in the industry feel that this condition will not last, that sound pictures will run their course as a novelty —and a short-lived one at that—and then do a fadeout.

It would seem, however, that such pessimistic growlings are hardly of loud enough volume yet to deter production heads from spending their money like a certain type of sailor on sound equipment and experimental sound work in an effort to be first with the latest wrinkle.

---

are not related so much to the mechanical design as to the optical systems used. I shall be interested to know the lens combinations used to get satisfactory results. It seems almost impossible to obtain uniform results without experimental work and get the proper lens combination. After working on one of the newer machines for trick photography for three months it is now working satisfactorily at Warner's; but at other studios they were about to abandon the printer. Their difficulty wasn't in the mechanical construction, but in obtaining satisfactory lenses. I wonder if Mr. Gregory could give us information on the lenses used.

Mr. Gregory: The lens system is designed especially for this machine and there is no trouble in securing definition nor in obtaining sufficient light intensity, even with very slow film such as duplicating stock.

The Optical Problem

Mr. Jones: The optical problem is somewhat complicated and several factors are involved. It is possible that attempts have been made to use lenses which are computed by the designer so as to give the best performance when used with an object distance which is very great as compared with the image distance, as, for instance, our standard motion picture objectives are used with a normal image distance of 1 or 2 inches, while the object may be from 10 to several hundred feet away. In the projection printer if the magnification is unity, obviously the object distance must be equal to the image distance, and I believe it is necessary to change the curvatures in order to obtain critical definition under these conditions. It would seem important, therefore, to be sure that the lens used in the projection printer is to be used under the particular conditions obtaining.

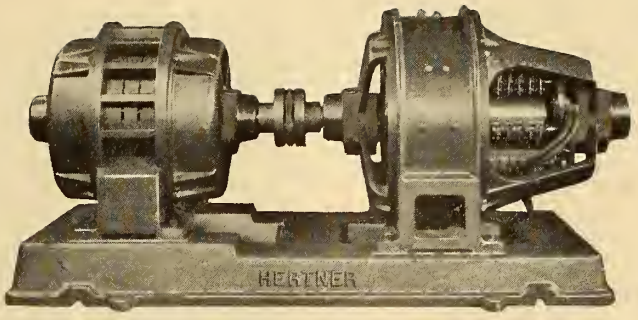
Mr. Johnston: I should like to add that we have supplied an f6.3 lens corrected for unit magnification—a lens having that field and critical definition which, as far as we know, is the most satisfactory for optical printing.

Mr. Jones: There is another factor which must be taken into consideration in projection printing. If the negative is made, of proper quality for contact printing, it will probably be somewhat too contrasty for printing by projection. The silver deposit in a negative is of a diffuse type and hence when density is measured by specular light the value is higher than when measured in diffuse light. That density effective in contact printing is of course diffuse density, while that effective in projection printing is the specular density. If, therefore, a print is made by contact and another by projection and the two exposed positive films developed together, the positive obtained from the projection print will be much more contrasty than the one obtained by contact. Allowance must of course be made for this.

Graininess in Film

Mr. Fear: Another point on which we had a great deal of trouble with the printer I built in 1920 was graininess.

Mr. Dubray: May I suggest the use of duplicating film of preventing graininess. This film can also be used to great advantage in altering the contrast of the original negative. Seldom does the cinematographer know in advance if the negative is to be printed by contact or in an optical printer. Very often a series of lap dissolves are decided upon after the picture is finished, and these lap dissolves are made by optical printing and duping. As the original negatives have different contrasts most likely, the use of duplicating film would seem very advisable.



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Projection Advisory Council

Herewith is presented the announcement of the formation of the Projection Advisory Council, an organization conceived and formed by a group of leading projectionists and others especially interested in projection work in this country. The following statement, issued by the Council, states the aims of the organization, its officers, committee heads, and directors, in addition to outlining the respective duties of the various committees. Anyone wishing further information about the Council may address the Council in care of this publication.

"Progress Through Understanding"

THE Projection Advisory Council has been organized to "develop a better realization of the importance of good projection and to assist all activities seeking to improve projection conditions." This is a broad and comprehensive declaration, requiring much detailed explanation, but the plans, which are quite simple and workable, have received the strong endorsement of Government and Municipal departments, large industrial and commercial organizations, engineering and projection societies and many of America's best known projectionists.

All the officials of the Projection Advisory Council are men of standing in this field, and have been connected with the motion picture industry for many years. The majority of them are noted projectionists and in the list of Directors and Chairmen of Committees are included manufacturers, business men, lawyers, a member of a State Legislature, graduates of well-known colleges, and officials of various organizations. All of them are ambitious, progressive men who have given much of their own time for the advancement of the motion picture industry.

The motto of the Projection Advisory Council, "Progress Through Understanding," is not a mere slogan, but a studied attempt to combine in these three words all the plans and purposes of this new organization. "Understanding" in its varied meanings conveys a comprehensive explanation of what the Projection Advisory Council will seek to accomplish for the advancement of projection and the motion picture industry.

"Understanding," signifying knowledge, will receive the attention of the Projection Advisory Council, and the projectionist aided in every way to secure all possible theoretical and practical information regarding his work.

To Promote "Understanding"

"Understanding" of the activities of all societies working for the advancement of projection is essential, and such organizations will receive the approval and cooperation of the Projection Advisory Council.

The Projection Advisory Council will promote "Understanding" which will enable the public to more fully realize that poor projection develops physical handicaps which greatly detract from the full enjoyment of motion pictures. The public as well as the industry should have a better "Understanding" of the artistic possibilities of good projection.



Lester Isaac, Supervisor of Projection for Loew's, Inc., and Associate Editor of "The Motion Picture Projectionist," who has been named President of the Advisory Council.

The Projection Advisory Council will create a clearer "Understanding" of the value of good working conditions in the projection room and show the tremendous financial loss created by defective equipment. Most of all, the Projection Advisory Council hopes to encourage "Understanding" that dispels "misunderstanding." All suffer by the ill-will created through the failure to properly realize the responsibility and problems of others.

Constructive Propaganda

The chief purpose of the Projection Advisory Council is to conduct a campaign of constructive propaganda and there will be no conflict with the work of any other organization, no duplication of effort. Ignorance and indifference are costly and can only be dispelled through education. A clearer realization of just what good projection means will be of inestimable value to the public and the motion picture industry.

Various agencies and individuals have worked in the past to improve projection conditions, but the efforts of the Projection Advisory Council will be more collective and concentrated. We feel sure that this unified influence is highly necessary in the Projection Department, which

(*Continued on page* 24)

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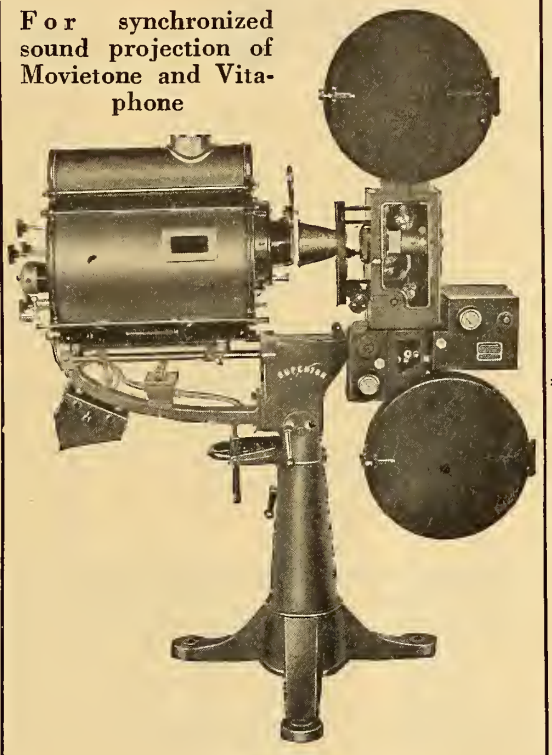
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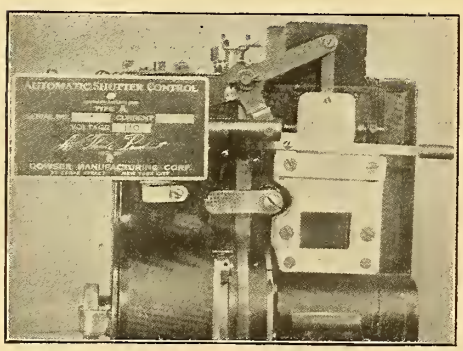
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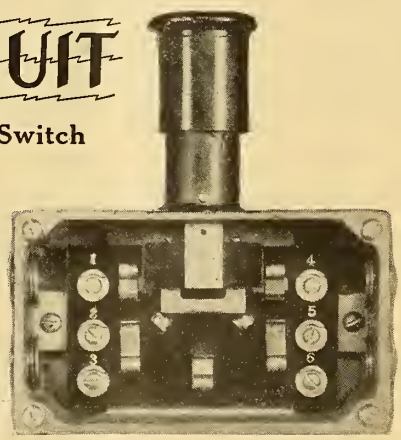
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The Optical Intermittent

(*Continued from page* 10)

stroy definition. It is more nearly correct to say that additional optical parts cannot improve definition. As far as plane mirror surfaces are concerned, it is a well known fact that they produce no change in the homocentricity of a bundle of rays.

Mechau Mirror Arrangement

Consequently, the use of a good mirror surface will not affect definition on the screen. The Mechau machine uses mirrors, and the double image that would be expected under ordinary circumstances is eliminated by Mechau in a very ingenious manner. Briefly stated, he introduces the mirror at a point in the lens system where the rays are parallel, so that, since the mirror does not alter the parallelism between the rays reflected at the first and second surfaces, and since parallel rays under the conditions described will terminate in a single point, no double image will be produced.

Under the same heading, they say that spherical and chromatic aberration are inherent in all forms of optical compensators, and that consequently these parts must be highly corrected for both aberrations. In the case of a mirror, neither of these aberrations is introduced.

Large Film Saving

On the subject of "Quietness," there is no dispute. A machine of this type, especially with a motion of pure rotation, may be made absolutely quiet. Regarding film economy, while the writers admit that a great saving in film is possible, they contend that it is not as great as claimed, due to the fact that a large part of the damage is caused by rewinding. At least they must admit that rewinding puts no strain on the sprocket holes, and after all, the torn sprocket hole is the worst form of film damage.

Under the heading of "Film Aperture," the writers point out that an inherent defect of all continuous projectors is that a triple screen picture is produced and that it is necessary to mask out the two undesirable pictures. Referring to the Mechau projector, there is no masking required, because the spot of light is of exactly the size and shape of the film pictures, and as explained before, moves with the picture.

The writer has not cited the Mechau projector as the final solution of the problem, although it is, in his opinion a remarkable piece of optical and mechanical work. It happened to answer all the objections brought out in the earlier paper and was cited for this reason. As a matter of fact, the machine is expensive and the compensating does not come under the heading of pure rotation but is a combination of rocking and rotating motion. The point in mentioning the Mechau machine is to show that engineers in our line, as in others, are apt to become dogmatic and by making careless statements, tend to discourage development.

Some of you may not be familiar with the history of the Mechau projector in this

(*Continued on page* 26)

Among the Local Unions

Local 245 — Lynn, Mass.

LOCAL 245 held its Annual Banquet on January 5th, at which time the election of officers took place. More than 40 members attended the Banquet, which is always the premier event of the year in Local circles. Everyone was so busy attending to the business at hand that peace and quiet reigned all evening, which, after all, was but an extension of the spirit prevailing throughout the year.

This was attested to by the fact that the entire Official Family were reelected to office for another year. The officers of Local 245, or rather their likenesses, are shown in the accompanying picture. Strength and solidity are reflected in this picture of the men who are to guide Local 245 during the coming year—particularly, shall we say, in the second row. At any rate, it is quite apparent that no one will have much success at rushing the officers off their feet. Unanimous!

A Versatile Membership

Also within eyesight is the likeness of one of the really prominent members of Local 245, the Right Honorable William Dickinson, whose pictured raiment indicates another accomplishment of this talented gentleman. When not in the kitchen, Brother Dickinson is active as Chief at the 3,500-seat Olympia Theatre in Lynn, a Publix unit.

Proud possessor of the first projectionist license issued in Massachusetts (in 1903) this hardy gentleman readily admits to being 30 years of age—at least! Excluding N. S. Courtney, the demon photographer, Brother Dickinson is the most popular man in Local 245—and particularly so when he dons yon pictured garb. Oh, yes—we forgot to mention that before becoming a projectionist way back in the Dark Ages, Brother Dickinson was billed in vaudeville as "The Human Pin Cushion." This latter attainment has absolutely nothing to do with his culinary accomplishments.



William (Jack) Dickinson, culinary mainstay of Local 245

Local 236, Birmingham

LOCAL No. 236 held its annual election of officers at the last regular meeting, and after a spirited campaign, elected the following to serve the local for the ensuing year: J. M. Cason, president; C. L. Gaston, vice-president; J. F. Mankin, secretary; J. C. Harper, treasurer; R. A. Root, business representative; C. J. Wall, sergeant-at-arms; F. L. Delaney, J. T. Amberson and W B. Tate, trustees; R. A. Root, C. L. Gaston and F. J. Emerson, Board of Examiners.



Officers of Local 245: Front row, left to right: Harland Cole, Sec.-Treas.; Maxwell Woodbury, Rec.-Sec.; and Harold Hunt, chairman of Executive Board. Back row: Leo F. Barber, President, and Charles Sowdon, Vice-President

Local 171 — Pittsburgh, Pa.

PITTSBURGH LOCAL 171 gave a benefit performance for its Sick Fund the latter part of December and succeeded in making the affair one of the most successful of its kind ever held under the auspices of a projectionist union. The leading talent of the theatres in Pittsburgh that particular week cooperated heartily in putting over the show before an audience of several thousand people.

The entertainment committee was headed by Roger McKelvey, who was assisted by Brothers Criswell, Williams and Hooley. The Sheridan Theatre, one of the largest and most comfortable houses in the city, was turned over to the Local for the event. Mr. Eugene Connolly, secretary of the Theatrical Managers' Association, gave every aid personally on behalf of his organization to make the affair a success.

Among the theatres represented by talent were the Nixon, Sheridan Square, Harris, Davis, Stanley, Capitol, and the Harris of South Hills. The masters of ceremonies were Teddy Heath, Bobbie Heath, and Jack Donohue.

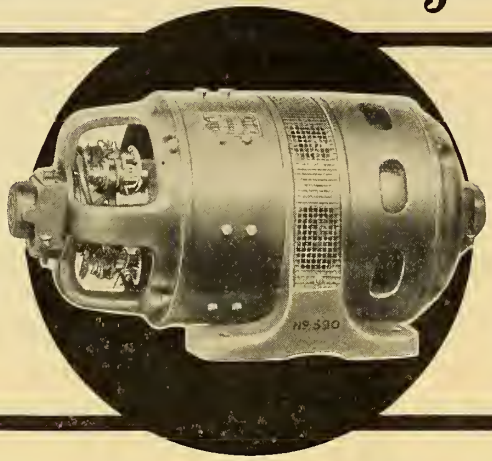
Managers' Assoc. Cooperates

The officers and members of Local 171 worked enthusiastically together to make this one of the most significant events in the history of this important and popular Local Union. President Snipe, Business Representative Brown and the others gave of their time and effort to put it over.

Every theatre manager in town gave the Local their full cooperation and support, a

(*Continued on page 28*)

Here is a *Specialized* Motor Generator Set for Motion Picture Projection



ROTH ACTODECTORS are not makeshift adaptations of standard motor generator sets, but are particularly designed for projection room arcs.

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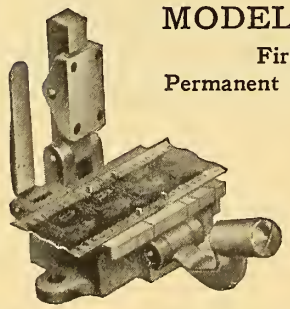
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DeVry Announces Sound Pictures for the Home

The DeVry Corporation, of Chicago, announce the Cine-Tone unit for immediate delivery. It consists of a regular 16 mm. motion picture projector, geared to a turntable, with tone arm and electric "pick up." This latter connects the sound direct with a radio loud speaker. The gear shafting forces absolute synchronization between the action on the screen and the sound on the record.

At one stroke a great library of popular electrically produced phonograph records such as the Victor, Columbia and Brunswick become wedded to motion picture illustration—and no expensive installations are required. The Cine-Tone is a compact light weight all metal unit that can be set on a small stand. With the record set on the turn table, and the film threaded in the projector, connect one electric cord to the wall socket for the movie projector and plug the other into the radio loud speaker or an independent loud speaker.

The present combination unit will cost less than the usual home projector alone—somewhere in the neighborhood of $185.00, and films or records may be run separately if desired.

Proper Screen Selection

(*Continued from page* 15)

with the normal equal to the angle of incidence, as in Fig. 6B.

Correct Positioning

A metallic surface screen in the theatre shown in elevation in Fig. 7 would give an unsatisfactory distribution of light if placed in position 1. Position 2 would

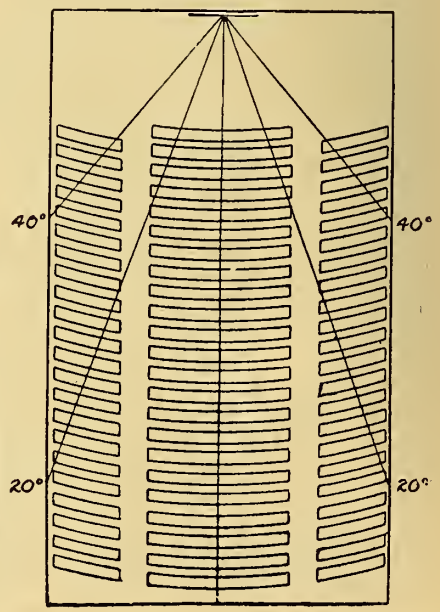
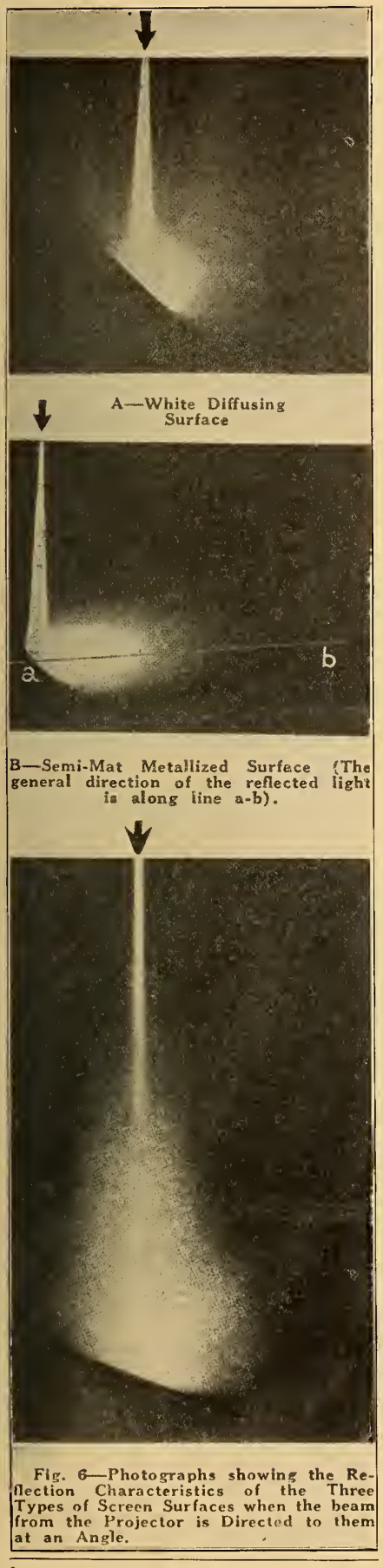


Fig. 5—Medium Width Theatre—The metallized surface screen has an average brightness as seen from 88 per cent of the seats about 2½ times that for a diffusing surface.



B—Semi-Mat Metallized Surface (The general direction of the reflected light is along line a-b).

Fig. 6—Photographs showing the Reflection Characteristics of the Three Types of Screen Surfaces when the beam from the Projector is Directed to them at an Angle.

favor the front seats at the expense of those in the rear and balcony, but position 3 would give a well-balanced distribution of the light. Tilting the screen backward at the top assists in raising the angle of maximum brightness, in case the screen cannot be mounted at the desired height.

The comfort of the audience must also be considered in determining the best screen position; if it is too high, those near the front cannot be at ease in viewing the picture. The bead screen reflects a maximum of brightness in the direction of the projector, as shown in Fig. 6C, because the specular part of the reflection is largely from that part of the glass bead surfaces

(*Continued on page* 31)

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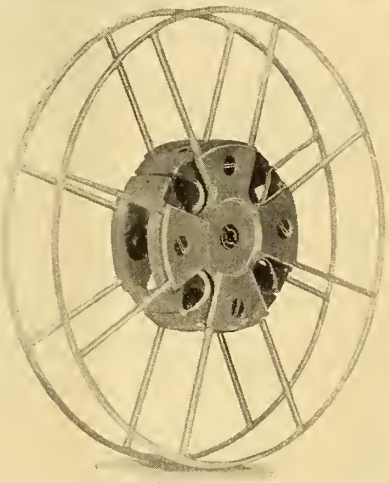
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

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THE new sound film reel, featuring a 5-inch hub, prevents the film from passing the aperture plate too rapidly—a necessity for good results in sound pictures. The speed can be much more closely regulated than that of the ordinary reel. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

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Projection Council

(*Continued from page* 18)

has attained a greater importance and become more complex with the tremendous expansion of the motion picture industry.

No attempt will be made to have the Projection Advisory Council comprehensively function at once; each Committee will be given one simple, workable but important task before starting any other activity for the Council. Elaboration of the plans of the Projection Advisory Council will be postponed until, by the successful performance of certain practical but highly essential work, we can gain the confidence of the industry. Accomplishment will be slow, but in the meantime we ask the industry to be patient and to have faith in the men who have associated themselves with the Projection Advisory Council.

Plan Proved Successful

The Projection Advisory Council is international in its membership, and all possible care is being taken in the selection of the Directors and Chairmen of Committees. Ideas similar to those upon which the Projection Advisory Council has been founded have been put into successful operation in many other industries, and we see no reason why equally satisfactory results cannot be secured by the Projection Advisory Council for the benefit of the motion picture industry.

We quote from an article by Harold J. Laski, published in *Harper's Magazine*:

"In the past, for the most part, men analyzed in solitude the facts before them; and they put down, without much mutual discussion, such vision as was vouchsafed to them. This procedure, it appears, was an error of high magnitude. We risk wasted effort when we use our narrowly limited individual resources in attacking problems which might yield to joint endeavors."

The work of a number of the Committees will be the routine activities of any organization, and some of the Committees will develop certain ideas which eventually can be put into successful operation. It is not practicable at this time to give details of the work of all Committees; but several will be taken to indicate how the Projection Advisory Council expects to put into practical operation the ideas and ideals upon which the Council has been founded.

As has already been explained, each Committee for the present will take one simple, workable idea and carry it to a successful conclusion before taking up other work. We fully realize that there are many ideas which deserve the consideration of an organization such as the Projection Advisory Council, but if too much is attempted at the start more harm than good will be done. In the simplest manner and with the fewest possible words the work of several of the Committees will be outlined.

Committee on Room Planning

The work of this Committee will be to have a pamphlet prepared on the "Fundamentals of Projection Room Planning." These fundamentals are size, lo

Dworsky Co. Launches Better Film Campaign

As a means of promoting a better understanding between projectionists and the theatre owners and managers, the Dworsky Film Machine Corp. of Long Island City, L. I., N. Y., has launched a campaign to enlist the support of projectionists everywhere in a movement to better film conditions.

Believing that certain defects on the screen are often attributed by the owner or manager to inferior projection work or poor selection of equipment by the projectionist, the Dworsky Company aims to bring to the attention of the managers the causes and remedies of unclean film.

The Dworsky campaign is now under way, requests having been sent to all Local Unions for assistance and suggestions as to the best method of combatting the evil of unclean film. A surprise feature of the Dworsky campaign will be announced in these columns next month.

Automatic Projector?

Announcement has been made in Washington, D. C., of the invention of an automatic projector with a capacity for 22 reels which are changed automatically and which, it is claimed, eliminates the necessity for a projectionist. Details of the alleged invention were not forthcoming when requested, but it is said that production of the machines is reported scheduled for Germany.

cation, ventilation, freedom from drafts, general working conditions, toilet facilities, etc. Only those matters will be considered which the owner and architect should allow for when the plans of the theatre are still on paper. For more exact technical information the Projection Advisory Council will recommend that the architect and owner consult experts in the various departments connected with the construction and equipping of the projection room. The Projection Advisory Council, however, will see that this pamphlet on the "Fundamentals of Projection Room Planning" is placed in the hands of architects and owners as soon as plans are filed. That is the time to consider the fundamentals, and not when the theatre is approaching completion.

Safety Committee

The first work of this Commitee will be to secure the fullest possible information regarding rules and laws on safety in projection rooms, condition of equipment, etc. When we have this information and conclusions can be reached, recommendations will be made by the Projection Advisory Council and presented to the industry. The work of this and the preceding committee is based upon ideas now in general practice in all large commercial and industrial organizations, that anything which affects the health of the employee reduces his efficiency. It is a part of wise, modern humanitarianism to free employees from handicaps which affect their health and safety. It is, also, a matter of plain, common sense and good judgment to provide all conditions which enable projectionists to do their work in the best possible way.

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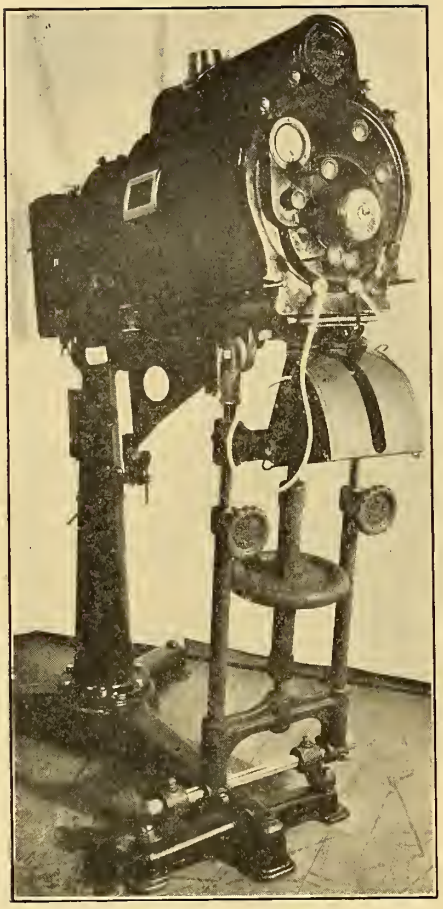
The work of the Equipment Committee will be to draw up standard specification sheets to enable owners and projectionists to give adequate information when placing orders for equipment.

Awards Committee

The work of this Committee will be "to suitably recognize any work for the advancement of projection or an act of meritorious nature performed by a projectionist." In many instances projectionists have risked their lives to protect patrons, and the Council believes that such men should receive recognition.

The Committee on Resolutions will give recognition to owners, executives and managers who promote higher projection standards by providing better working conditions and establishing pleasant relations with projectionists. Executives who encourage skill and conscientious effort are a more potent influence for the advancement of better projection than has been generally realized.

The activities briefly outlined may not necessarily be the most important for the new organization to consider, but they are unquestionably the most advisable to take up at this time. "Nothing would ever be attempted if all possible objections must first be overcome," and every department of the industry is asked to send the new organization off with "Best Wishes" even though no more tangible assistance can be given until the Council has put some of its plans into practical operation.



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The Optical Intermittent

(*Continued from page* 20)

country. It was installed at the Capitol Theater in New York in 1926 and after being used for several months was discarded. The writer made several attempts to find out the reasons and found that no irremediable faults had developed. It was found that the illumination was no greater than in present machines, and that the screen image generally was no better. As the present writer sees it, the value of such projector should lie not in getting a better picture but in simplification of machinery, and elimination of wear in both film and projector.

The writer has listed below some advantages of the optical intermittent machine over the mechanical. This is on the assumption that the optical compensator is of a rotary nature, is not too expensive, and gives a satisfactory picture on the screen:

Nine Salient Advantages

1. Reduction of wear on sprocket to a minimum.
2. Reduction of tension at the gate to a minimum.
3. The possibility of a virtually oil-less machine, or at least a design removing all possibility of splashing oil on film.
4. Freedom from wear and tear in the machine itself, and consequent lessening of danger of breakdown; small cost for replacement of worn parts.
5. The possibility of various desirable features of operation such as running film backwards for rewind, and self-threading of reel.
6. Quietness. While noise from the projection room is not today a serious matter, the elimination of the subdued machine-gun effect should be of value. In home projectors, very valuable.
7. The practicability of the "additive" process of color: either two-color or three-color because of high speed attainable without excessive wear and unsteadiness.
8. Removal of vibration from film, making the problem of sound reproduction from the edge of film much simpler. In connection with sound pictures of the Movietone type, it is of great importance to keep the film in the best possible condition, as the sound wave pictures are more delicate than the ordinary picture.
9. The possibility of using less durable substitutes for celluloid films because of the lessened strain on the perforations.

The Mechau Projector

The following information on the Mechau Projector is a translation from a description which appeared in "Der Filmspiegel" (Col. 10, No. 12), German film paper. It is hoped that the rather sketchy description of the Mechau which is afforded in the following article will be augmented by a detailed statement of the principles involved in the operation of this continuous-type projector to appear in an early issue.

THE movement of pictures on the screen is produced by a rapid succession of still pictures, which show differences of time and space, although they may be very small. Their rapid succession creates in the eye of the beholder the illusion of a natural motion. Until recently it was not possible to run the pictures in continuous motion through the projector, as by so doing the picture becomes ill-defined and hazy. It was therefore necessary to project the film while it was at rest and to render it invisible while in motion. These conditions we are all familiar with.

This, then, is the origin of the shutter and intermittent movement. The mechanical intermittent puts the single picture at rest for a short time and then moves it forward very rapidly. While this forward movement is going on a shutter moves in front of the objective lens, interrupting the projection.

All this is accomplished in such a short time that it remains hidden to the eye and at the same time creates the illusion of continuous projection. It can easily be understood that such a system has many disadvantages.

This continuous blending, a steady change between light and dark, produces the well-known flickering which at modern projection speed is no more visible but which will be felt by the eyes at prolonged projection. A further disadvantage lies in the all too-rapid movement of the intermittent movement, resulting in constant wear and tear not only on the film but on the parts themselves.

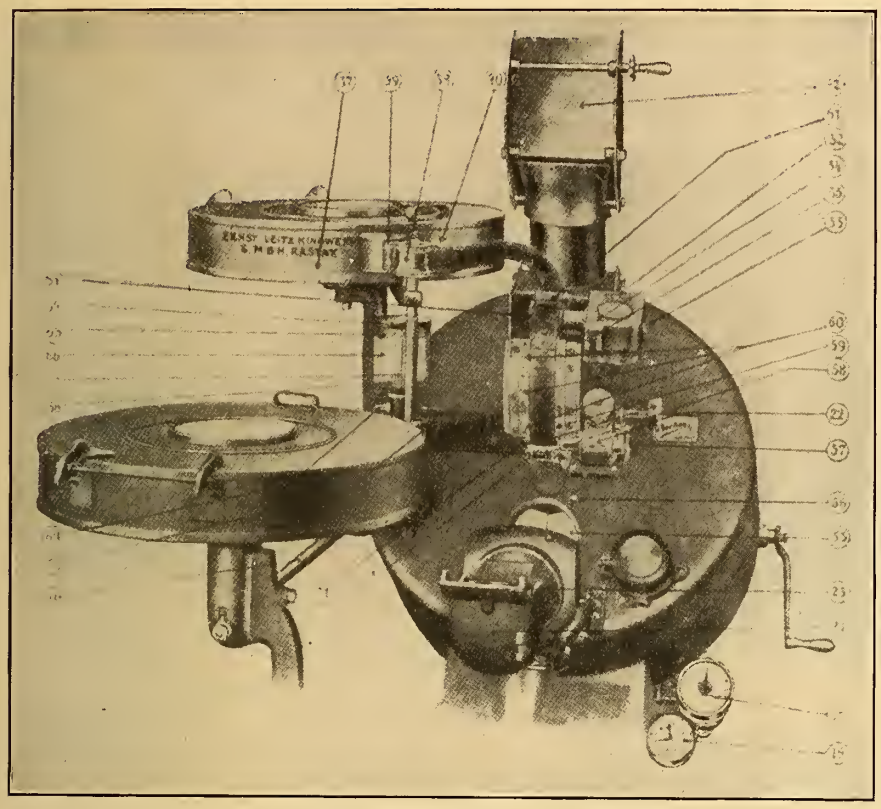
For this reason experiments have been carried on for a long while in an endeavor to eliminate the shutter and to run the film continuously.

Basic Principles

The experimenters proceeded along this line of thought: If you throw with an ordinary mirror the light of a candle on a white wall, the reflected picture will move as soon as you move the mirror. But if the candle moves with the mirror, it is possible to keep the light steady on the wall. This phenomenon is known as the principle of "optical dissolve."

In place of the light source imagine the illuminated film picture and you have thus mentally constructed a projector after the above principle. As simple as this principle may appear, just as difficult is its adaptation. Only one firm has thus far been successful in placing on the market a useful projector of this type. The development of a projector of this type is due to the incessant work and ingenuity of Eugene Mechau, whose name the continuous projector bears.

The accompanying illustrations detail the various parts of this continuous projector, and this, together with the simple explanation of its operating principle given at the start of this article, will convey to the



Another view of the Mechau projector

16. Timepiece.
17. Speed indicator.
21. Large film gate.
23. Film tension shoe.
55. Sector mirror.
56. Gate adjusting nob.
57. Oil Gauge.
60. Film track (adjustable).
35. Safety catch.
34. Self-locker, shutting the light off at a speed of less than 8 pictures per second.
62. Mirror frame.
38. Upper sprockets.
37. Upper magazine.
65. Oil filter.
66. Oil reservoir.
70. Lower sprocket.

minds of projectionists the operation of this machine.

Turning around a main axis are eight visible mirrors. These mirrors, while revolving, are also undulating, or rocking. To this end they are connected to a curved ring on which they are guided. The movement of these mirrors must of necessity co-ordinate with the movement of the film to gain a satisfactory result, as the smallest difference produces a hazy picture and poor definition.

Recently several improvements have been effected in the optical system of the Mechau projector. To improve the picture and to reduce the light losses, the rays passing the aperture are moving with the film picture by means of the rotating and rocking mirrors.

Other improvements include the development of an oiling system whereby the oiling of the mechanism is accomplished from one central reservoir (shown in the illustration). Also, the ever-present danger of fire has bzeen reduced to a minimum. A long, air-tight film channel will smother any ignition of the film at the very start. An automatic fire shutter will cut the light rays at a speed of less than 40 feet per minute.

Another special advantage of this type of projector is its great changeability of speed without in the least affecting the steadiness and sharpness of the picture. The speed control is similar to the one employed on the Simplex projector (American). Any type of reflector or high intensity lamp can be used on the Mechau.

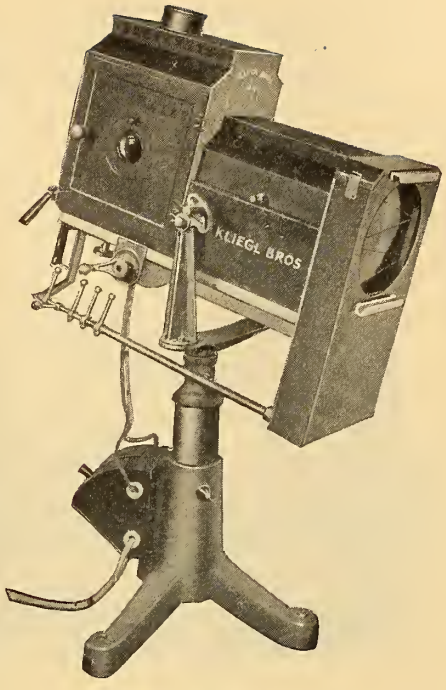
Application to Sound

It should be mentioned that this continuous projector is especially adapted for the projection of sound film. Those acquainted with the projection of sound films know that its success depends on the easy and indistinguishable movement of the film, which must, of course, be in perfect condition. To keep a film in this perfect condition is one of the important functions of any good projector.

The Mechau projector will run a film a great number of times without damaging it even to the smallest extent. For this reason alone a projector of continuous-movement type possesses a distinct advantage over the mechanical-intermittent type.

The difference in the quality of picture obtained by a continuous projector and that projected by a mechanical-intermittent type is most pronounced, and many a casual observer has noticed the soothing effect of a picture without knowing that the results were obtained with a Mechau.

The superiority of the continuous-type projector is, however, immediately apparent to those who understand the principle of the "optical dissolve."



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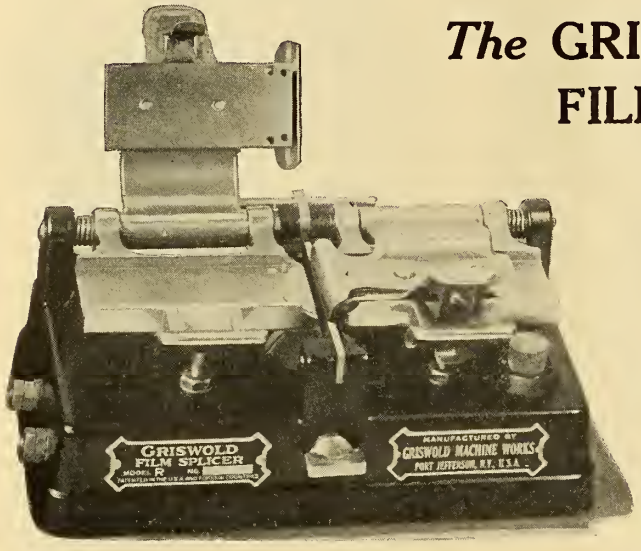
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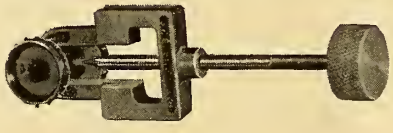
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Do It Now!

Among the Local Unions

(*Continued from page* 21)

striking indication of the esteem in which Local 171 is held in Pittsburgh theatrical circles.

The Sick Fund was swelled by a very substantial fund realized from this affair, as a result of which many important plans formulated by the Sick Fund Committee for the coming year may be executed without handicap through lack of adequate finances.

The committees who planned this benefit wish to take this opportunity to again thank the membership for their splendid cooperation and unceasing efforts to make the affair the great success it was.

Local 650, Westchester, N. Y.

The following is our Westchester correspondent's idea of something to report and the proper way to report it:

Well, here we are again. This time we will try to tell something about our members. To begin with, our B. A., Arthur Martens, still has the glass top on his desk, but it is made of shatterproof glass, so we won't worry about that (whatever that means). Our good friend George Alley has gone and invested his hard-earned (?) "dough" in a new Chevvy 6. This means that the dust will fly in New Rochelle. ('Twas ever thus.)

Our Fin.-Sec., Fred Thome, he of the tight clutch, is still challenging anyone to a coffee contest. Fred has been known to consume 20 cups at one sitting and still have a good night's rest. (This is possible *only* in New Rochelle). The other day while out in his "kluck" Fred was seen waiting for the red light on a fire box to turn green. He got home the following Monday.

(Note: Altogether a splendid bit of reportorial work. If what is set forth above is true, the reason for Local 650's amazing progress is at last made clear.)

Errata

In "W. E. System Operation and Maintenance," by Rudolph Miehling, which appeared in the December issue, a typographical error made the 14th line in the 3rd column on page 8 read: "Each horn consumes 1½ amps., and you use the system six hours:—therefore you will have taken out 7½ amperes. The latter part of this sentence should have read: ". . . therefore you will have taken out 9 amperes."

Broadcast Sound Film

In Houston, Texas, recently the picture "Interference" was broadcast by station KCPR. Telephone lines were run into the projection room of the Metropolitan Theatre from the control room of the station, the sound vibrations were picked up, amplified, regulated and then put on the air. The broadcast was an exploitation stunt for the run of the film at the Metropolitan, engineers terming the test a success.

Helpful Projecting Hints

FILM damage can sometimes be more easily traced if it will be remembered that certain projectors run the film emulsion, or dull, side against all three sprockets, while on others the support, or shiny, side only touches the sprockets. For example: If film is received showing tooth marks on the emulsion side, it is fairly simple to determine on what make or makes of projectors it has been run, especially if the investigator has familiarzed himself with the different types of sprocket teeth.

On some projectors so-called strippers or stripping plates are provided to prevent, by any chance, the film from winding around or "following" the sprockets, as well as to remove any accumulation of dirt that may tend to form at either side of the sprocket teeth.

In resetting these strippers after the replacement of sprockets extreme care must be taken to see that they do not come in contact with the teeth, as this will cause the teeth to wear to a sharp edge which will severely damage any film coming in contact with it.

Unnecessary Oiling

Flooding the projector mechanism with oil is unnecessary and causes oil to get on the film. Dust then adheres to the film, making good projection impossible.

This practice of over-oiling also is a fire hazard, as oily film will catch fire a great deal easier than that which is clean. Aside from the intermittent case, one drop of a good quality oil in each oil hole will be sufficient for the average day's run.

Correct Film Loops

Excessively large upper or lower loops either cause a rattle in the film guard above or allow the film to drag in any oil which may be present below. The film also has a tendency to jump the sprockets, which can take place if the idlers are set too far from the sprockets.

The practice of resetting loops while the projector is running should be discouraged, as in many cases the sprocket teeth strike outside of the perforations, or otherwise damage the film.

Larger Apertures—Less Light

At the present day much larger lens apertures are being used, F.1.8 being quite common in some studios. This means that considerably less light is required for taking a picture, and the accurate manipulation of the camera necessary when using wide apertures is aided by the ease of control of gas-filled lamps.

It will take some time for cameramen and others to become accustomed to lighting by gas-filled lamps, but the increased use of Panchromatic film, wider lens apertures, and the production of talking films, are all tending in the direction of incandescent lighting.

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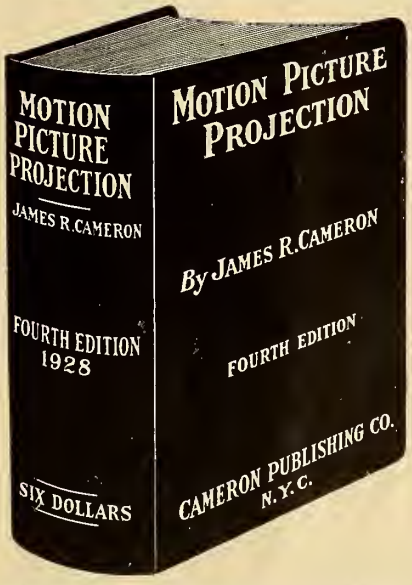
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Local 306 Banquet

The Fifteenth Anniversary Dinner-Dance of Local 306 (New York) will be held in the grand ballroom of the Astor Hotel on Saturday evening, January 19th. Tickets for this affair were all disposed of two weeks in advance of the event.

At this banquet Local 306 will add several prominent names in the industry to its honorary roster. Delegations from many Locals in the East will be present at the affair.

2,000 RCA Installations

RCA Photophone Corporation has set 2,000 installations of its sound system within 12 months as its goal during 1929, according to a statement by E. E. Bucher, executive vice president of the company. The new RCA recording studio in New York is now completed, with production of feature and short sound pictures to begin immediately.

Mr. Bucher sees 1929 as a year of great expansion and progress in the development of sound pictures.



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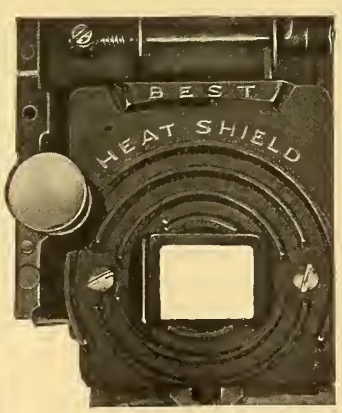
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Those Contact Points

IF the contact points on the various forms of arc controls have been causing you much trouble—and, for that matter, the contact points on the distributor of your car or anything electrical where small contact points are used, whether of platinum or tungsten metal—the thing to do is to go to the nearest Bosch Magneto Service Station, where for fifty cents you may buy a little round, wooden box containing a small flat file and an oilstone. Both these articles are about 2 inches long by 5/16 inch wide and are very thin.

These articles are made for dressing all sorts of contact points—the file for platinum, and the oilstone for tungsten points, the latter being a very hard metal capable of damaging the staunchest file.

Procedure

Separate the points and hold with one finger; while rubbing with the stone or file keep it at a right angle to the side of the point. It is not necessary to remove all the pitted surface, as this will waste a lot of metal away, but it is important that both surfaces of points be exactly parallel to each other for the best results.

The platinum points need only a small amount of filing to brighten them up again. After dressing, be sure to wipe points clean with a piece of paper inserted between them, the while pressing lightly on the free point and drawing the paper out and blowing the dust particles away. Even a small grain of dust will keep the points from making contact.

Excessive Sparking

It is not necessary to use oil on the stone. If the points spark excessively, and everything else is okay, a small condenser such as is used for magneto work may be secured at the same store. Connect this condenser across the two points, one connection to each point. This will check a large amount of the sparking and prolong the life of the points.

Try this procedure on your car and see the difference at the plugs; you will also note more power and the easier starting in cold weather. Do not put a condenser across the points in the distributor (unless it is punctured) as there is one there already.—WILLIAM E. COX, Local 306.

Giant Beacon Light for Mid-West Skyscraper

Authorization of an aerial beacon light to be placed atop the tallest building in the Mid-West has been announced by Capt. F. C. Hinsburg, chief engineer, Airways Division, Department of Commerce, Washington, D. C. The new light of 2,000,000 candlepower is expected to be in operation on the 32-story building of the W. B. Foshay Company, Minneapolis, Minn., by Jan. 1, 1929.

The light will be about 450 feet above the ground and 1,287 feet above sea level, revolving at the rate of 2 revolutions a minute. It will carry a 2-foot parabolic mirror and its lamp will be a 1,000-watt T-20 type, which will burn from sunset to sunrise.

Columbia Phonograph Co.'s Non-synchronous Device

The Columbia Phonograph Company has entered the motion picture field with a non-sync. disc device to be known as the Columbia Theatrephone. Record library and cueing service for this device will be ready about February 1st.

The machine consists of two electric amplifying units, motors, turntables and other reproducing equipment. The two units are housed in a single cabinet, the turntables being side by side, each having its own pickup arm. A cone speaker is attached to each amplification unit, and is separate from the operating machine. Each is enclosed in a wooden case provided with a baffle board, each speaker having about 30 ft. of connecting cable.

The turntables operate separately from the electric pickup amplifiers and speakers. A separate on and off switch is provided for each unit, so that either or both may be used at one time.

Proper Screen Selection

(*Continued from page 23*)

normal to the beam. Obviously this screen finds its best application in theatres where the seats are not far below the projected beam. The direction from which the incident light is received has little effect on the distribution from the diffusing screen, as shown by Fig. 6A.

The screen brightness necessary to produce the best pictures varies with reflecting characteristics and texture of the screen surface employed. The most satisfactory brightness appears to be materially lower with a diffusing type of screen than with those giving a pronounced directional distribution. This tends to make the results with the diffusing screen relatively better than would be indicated from the respective brightness values given in the above discussion.

Essential Factors

An additional factor to be taken into consideration is that a lower order of brightness suffices for the seats nearer the screen than for those farthest away. Although for a given light source the screen brightness decreases somewhat with the larger pictures, there is a compensating factor in that the brightness required for a good picture decreases as the size is increased.

The proportions of the theatre, the range of seat elevations and the position of the projection room with reference to the stage must therefore all receive careful consideration in the selection and mounting of the screen.

The relative size of the screen images is in direct proportion to their distances from the projector. When the light is projected at a considerable vertical angle from the normal to the screen, the picture will be noticeably wider at the bottom than at the top. The distortion of the picture as well as the distribution of screen brightness to all parts of the audience, accordingly imposes limits in the design of a theatre.

The architectural treatment of a new theatre can readily be adapted to produce conditions for favorable screen results.



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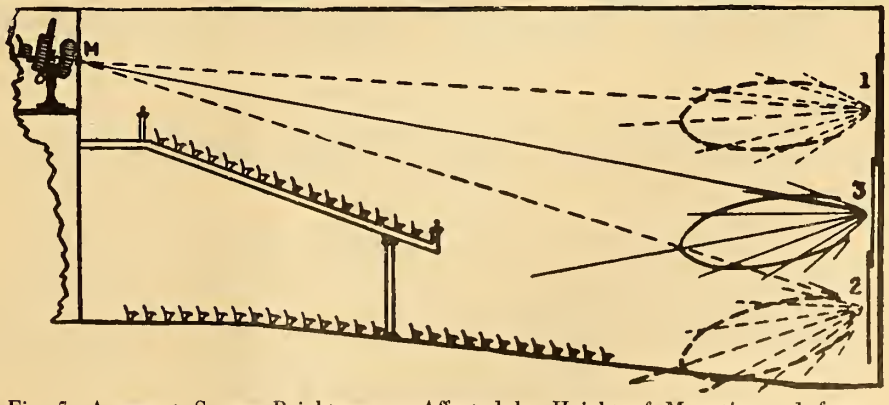
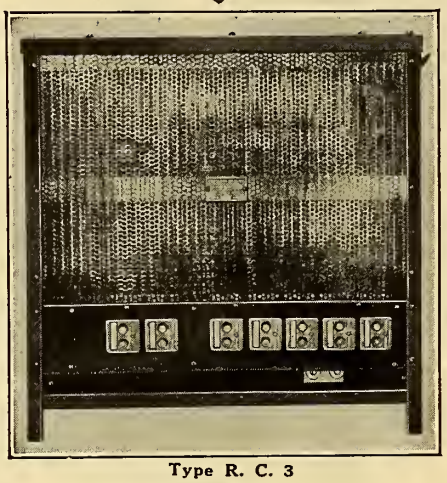


Fig. 7—Apparent Screen Brightness as Affected by Height of Mounting: 1 favors high balcony seats; position 2 wastes most of the light; 3 is probably most effective.

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Precision Work Features "Sound" Manufacturing

THE first sound picture or talking movie designed especially for purposes of military instruction was completed recently and shown before a representative group of military and naval officials. The film was made at the Infantry School at Fort Benning, Georgia. It is a result largely of the Western Electric Company's experimental work and production methods.

One of the "most difficult of all production tasks," to quote the company's statement, was placed before the Hawthorne organization of the Western Electric Company by the enthusiastic public reception of the talking pictures.

Half Million in Equipment

More than $500,000 worth of the most modern machine equipment had to be bought, and especially adapted to this project. A heavy production schedule was set up. The tool room was geared up to capacity for turning out the required tools. A storeroom covering 6,500 square feet of floor space was built in record time for the storage of material, process parts and apparatus.

Accuracy and precision were the basic features in the planning. One ten-thousandth part of an inch was a familiar item. The finest work was necessary in the manufacturing processes entailed in making the new condenser type transmitter (the microphone used in recording for the talking pictures).

One small disc, a part of the transmitter, must be ground until its surface is exactly flat—microscopically flat. To test this flatness a quartz disc is used. By placing this disc on top of the other disc, a patchwork of light rays broken into spectrum rays is seen. If this patchwork of light rays does not have a certain design then there is something out about the flatness of the manufactured disc.

Dust-proof Rooms

Dust-proof rooms are used for transmitter assembly. Dust, any speck of it, in this instrument, would be fatal. Glass cabinets, with all the moisture exhausted, contain the parts which are assembled in the cabinet. The workmen place their wrists through rubber sleeves fixed to the cabinet in order to assemble the parts.

RCA to Make Projector Installations Soon

Upon conclusion of a number of private tests of the new model P2 RCA projectors, this company will begin to make installations of the machine. Experimental work on these projectors has been in progress for about a year now, and it is understood that very little remains to be done to ready the machine for actual projection room work.

The RCA projector was planned and built particularly for use with the Photophone sound system which is sponsored by them. Several of these machines are now installed in the Eastman Theatre, Rochester, where exhaustive tests under actual room conditions were conducted.

Where to Buy *Good* Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

These Dealers, by the fact of their being on this page, show that they value your friendship and your good-will. They appreciate your importance as a buying power. Instead of ignoring your existence or trying to reach you inexpensively by reaching your theatre manager, they are advertising direct to you. Let this show of good-will be mutual.

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AMUSEMENT Supply Company, Tampa, Fla., W. C. Burgert, Manager. Established in 1904. The oldest dealers of theatre equipment in the South. Fully qualified and experienced, and backed up by the best in equipment to render you tbe best service. Strictly Independent.

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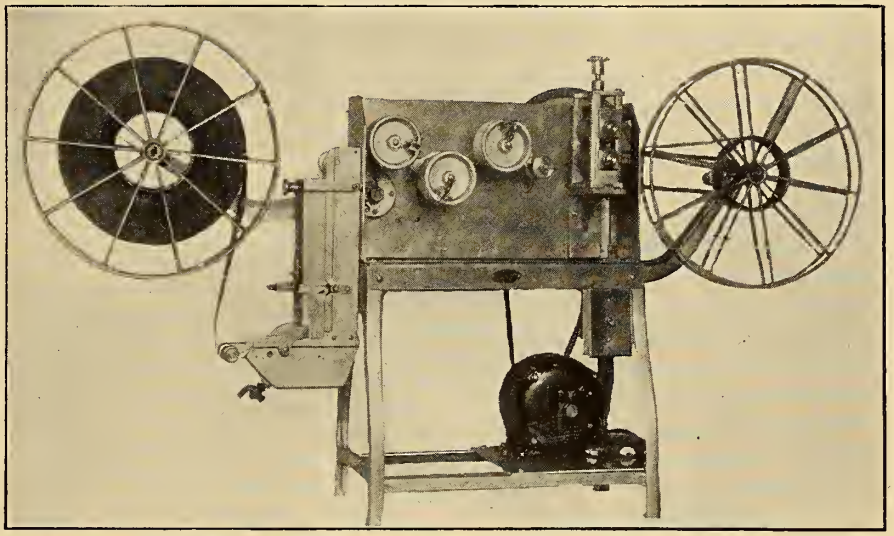
The R.M.A.'s Definition of a Dynamic Speaker

After great deliberation the Aural Devices Committee of the Engineering Division of the R.M.A., of which Paul Andres is chairman, approves the following definition of a dynamic loud speaker:

"A dynamic speaker is one in which the portion of the conductor carrying the alternating signal current is a part of the moving system, the force producing the motion being due to the location of this conductor in a magnetic field."

Make it Unanimous

This, in our estimation, is swell. And now the N.E.M.A. has a definition, and if the I.R.E. gets up a definition, and the Bureau of Standards gets up a definition, and they can all agree upon one which the National Better Business Bureau will not object to, we may be able to learn what a dynamic speaker is. By that time another craze in loud speakers will probably be on the horizon, and we can repeat the performance ad libitum.—RADIO BROADCAST.



Mr. Projectionist! Your manager and the public depend upon you! It is your responsibility to see that you have a clear and perfect picture on the screen. It is up to you to see that all causes of eyestrain, such as flickering, rainy and cloudy effects are eliminated!

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"Sacrificed to Sound"

By LESLIE EVELEIGH, F.R.P.S.

Photography Editor *"The Bioscope"* (London)

THAT all is not well, internally, in the sound situation in America, is becoming more evident as the "talkies" develop—I speak, of course, from the technical standpoint. Now comes to hand, from a very well known Hollywood cinematographer who is a prominent member of the A.S.C., a bitter indictment as to the cavalier way in which everything except the sound record is being treated. He makes the plain statement, without any compromise, that cinematography is being sacrificed on the altar of sound.

He adds that "apparently the 'talk' in 'talkies,' is being counted upon to overwhelm our sense of hearing with fascinating sounds to such an extent as to leave all powers of perception relatively numb to visual stimuli, good or bad."

A story comes to mind of a farm hand who was instructed to grease the wheels of a wagon. He did the job and later on it was found that he had only treated the front wheels. When asked the reason, he said that as long as the front wheels went round, the rear wheels just *had* to follow. In this new sound picture situation, it seems that cinematography is in the place of these rear wheels; if the wheels of sound revolve, the wheels of cinematography *must* follow.

To Be Shouted Down?

It can hardly be expected (I again quote our friend of the A.S.C.) that the electrical sound engineers, immersed as they are in their own problems, totally foreign to the practice of cinematography as an art and as a factor in the economy of picture production, would always consider fully, in the development of their devices, the needs of the cinematographer.

Naturally, our American friend is only concerned, in his condemnation, with those processes which incorporate the sound record on the same strip of film as the pictorial record. Cinematography is not greatly affected by the phonograph or gramaphone method of reproducing sound, because this type of recording does not interfere with the cinematographer in the carrying out of his job. Certain limitations are imposed it is true, such as the use of sound-proof booths for the cameras, and the necessity of using incandescent light, but cinematography has nothing to lose in acquiring a gas-filled lamp technique, or in being forced to find a way to make the cameras silent in operation; but when sound reproduction, as embodied in the various photographic methods, enters vitally into the cinematographic process and degrades it, the cinematographer can no longer afford to remain quiet.

When such is the state, as they have it in America to-day, it becomes necessary that the problems of cinematography be duly considered and acted upon, while the sound process is being developed, standardised and adapted to the needs of motion picture work.

Let us examine a few of the factors of sound production that are now at work to undermine the cinematographic structure. The camera, in many cases, has been saddled with a great deal of accessory machinery, the hindrance of which only a cinematographer can appreciate. Simplicity, accessibility and mobility of camera equipment, is one of the main factors on which the cinematographer depends for efficient and economical performance of his duties. Any method that burdens the camera with more than a synchronous motor is not desirable.

Much harm has been done by forcing the cinematographer to give up picture space to make room for a sound track. It has imposed upon the industry the new picture size of about 18 by 24 millimetres.

Based solely on its own merits this size has no valid claim to warrant its adoption as a new standard. This shape has been foisted upon the cinematographer simply to meet the exigencies of sound production. Let us consider it for a moment. It is so nearly square as to seriously limit the scope of this proportion artistically, and furthermore, it is not centred on the optical axis of the camera lens. Can this be a subtle tribute to the artistic soul of the cameraman, implying that he is capable of indifference to such an obvious and irritating lack of precision?

Another shape of approximately 16 by 21 millimetres, which was at first adopted in the variable area system of General Electric, while presenting an acceptable proportion is smaller in area by nearly 25 per cent. which increases materially the problem of grain due to the greater magnification necessary when projected on the screen. Sit near the front in a theatre having a large screen and you will appreciate this factor.

When the cinematographer is not only forced to give up space on the positive print, but also must share the exposure on the negative, the situation is bad indeed, for it entails a degree of loss in the control of his medium, beginning on the set with the operation of the camera and carried on through into the laboratory.

Spoiling the Picture

Despite assurances from the scientists of sound, that standard and unvarying conditions of development (necessary for the sake of the sound record) will automatically give the picture record the best possible treatment, many cinematographers will insist that deviation from standard conditions of exposure and development under certain conditions is absolutely necessary in order to achieve the effect they desire. Fortunately for the cinematographer, and for the sound technicians too, probably the practise of combining the sound and picture record on the same negative is losing ground.

In the final printing of the picture and sound records for release, the film has to be run through the printing machine twice, once to expose the picture record, and again, to expose the sound record. In order to overcome this economic waste, the practise has grown up of making a "dupe" negative, in which the sound track is properly adjusted to the picture in regard to both exposure and synchronisation. Such a negative greatly simplifies the printing operation, and reduces the cost, but the result, photographically, leaves much to be desired. This is especially noticeable when a comparison is made with other scenes in the same picture that have no sound accompaniment.

A Parting Shaft

Thus we complete the vicious circle. In this case we are forced to the conclusion that the sound record does not belong on the motion picture film—that a grave error of policy has been made in so joining the two. Let us face this issue squarely—continues our American cinematographer. Photographic reproduction of sound has a manifest destiny, but not as a parasite on the motion picture record. It must put down roots of its own, and the tap root must be a cheap, simple, independent vehicle for its record.

Under present conditions a separate sound record occupies about one-eighth of the available area of the film. To use such a record separately in the theatres would be obviously costly and wasteful. In some cases the photographic record is transferred to a phonograph disc for release. This, however, is still begging the questions because while it gives cinematography necessary consideration it forfeits the possibilities of the photographic method of sound reproduction in regard to quality for the sake of the cheapness of the phonograph record.

The answer, then, is to transfer the sound record as obtained independently on motion picture film, not to a phonograph disc, nor to the picture film, but to a separate photographic vehicle at low cost.

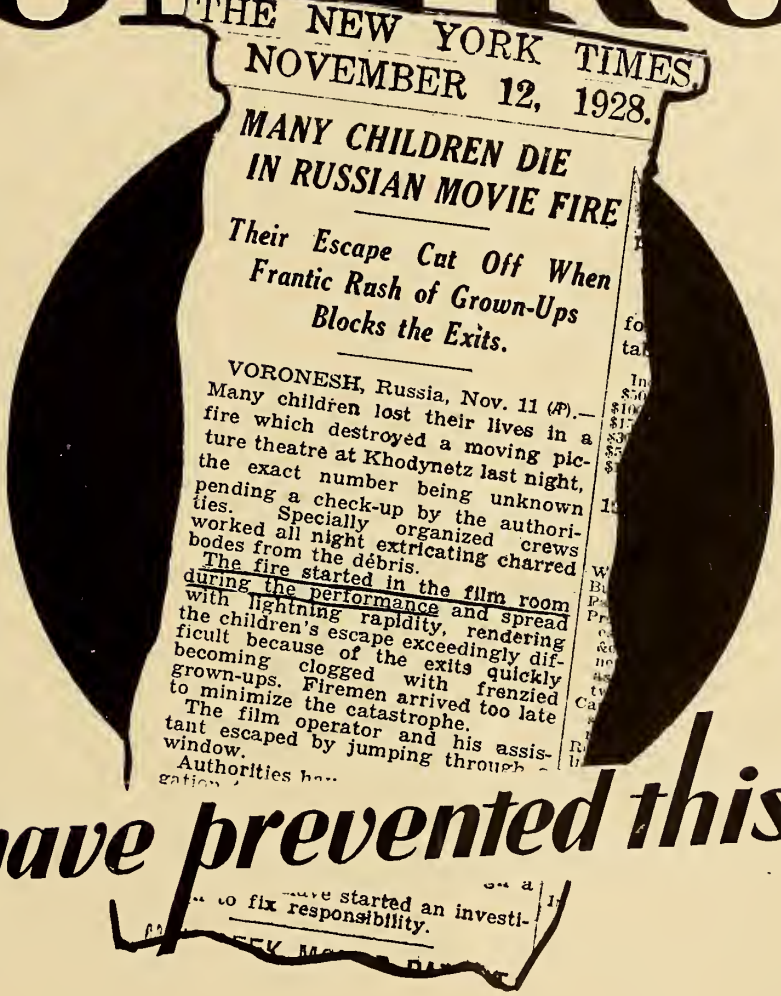
It is conceivable that such a record could be placed either spirally on standard film and thus make use of the full width of the film, or as a single track on very narrow film or even spirally on a cylinder. Here, at any rate, is an opportunity for research and invention in response to a basic need.

The cinematographer's parting shaft is couched in typical American forcefulness. He says: "Cinematography is glad and willing to be a brother to sound technology, but it has no desire to have him as a Siamese twin." Plain speaking, admitted, but they are like that in the States, and plain speaking gets things done.

Huge W. E. Sound Contracts

A total of $15,000,000 worth of contracts on hand for manufacture during 1929 at the Western Electric Hawthorne (Chicago) plant is the estimate of W. E. officials. These contracts are all for sound projection equipment.

SENTRY SAFETY CONTROL


THE NEW YORK TIMES,
NOVEMBER 12, 1928.

MANY CHILDREN DIE IN RUSSIAN MOVIE FIRE

Their Escape Cut Off When Frantic Rush of Grown-Ups Blocks the Exits.

VORONESH, Russia, Nov. 11 (AP).—Many children lost their lives in a fire which destroyed a moving picture theatre at Khodynetz last night, the exact number being unknown pending a check-up by the authorities. Specially organized crews worked all night extricating charred bodes from the débris.

The fire started in the film room during the performance and spread with lightning rapidity, rendering the children's escape exceedingly difficult because of the exits quickly becoming clogged with frenzied grown-ups. Firemen arrived too late to minimize the catastrophe.

The film operator and his assistant escaped by jumping through a window.

Authorities have started an investigation to fix responsibility.

would have prevented this tragedy

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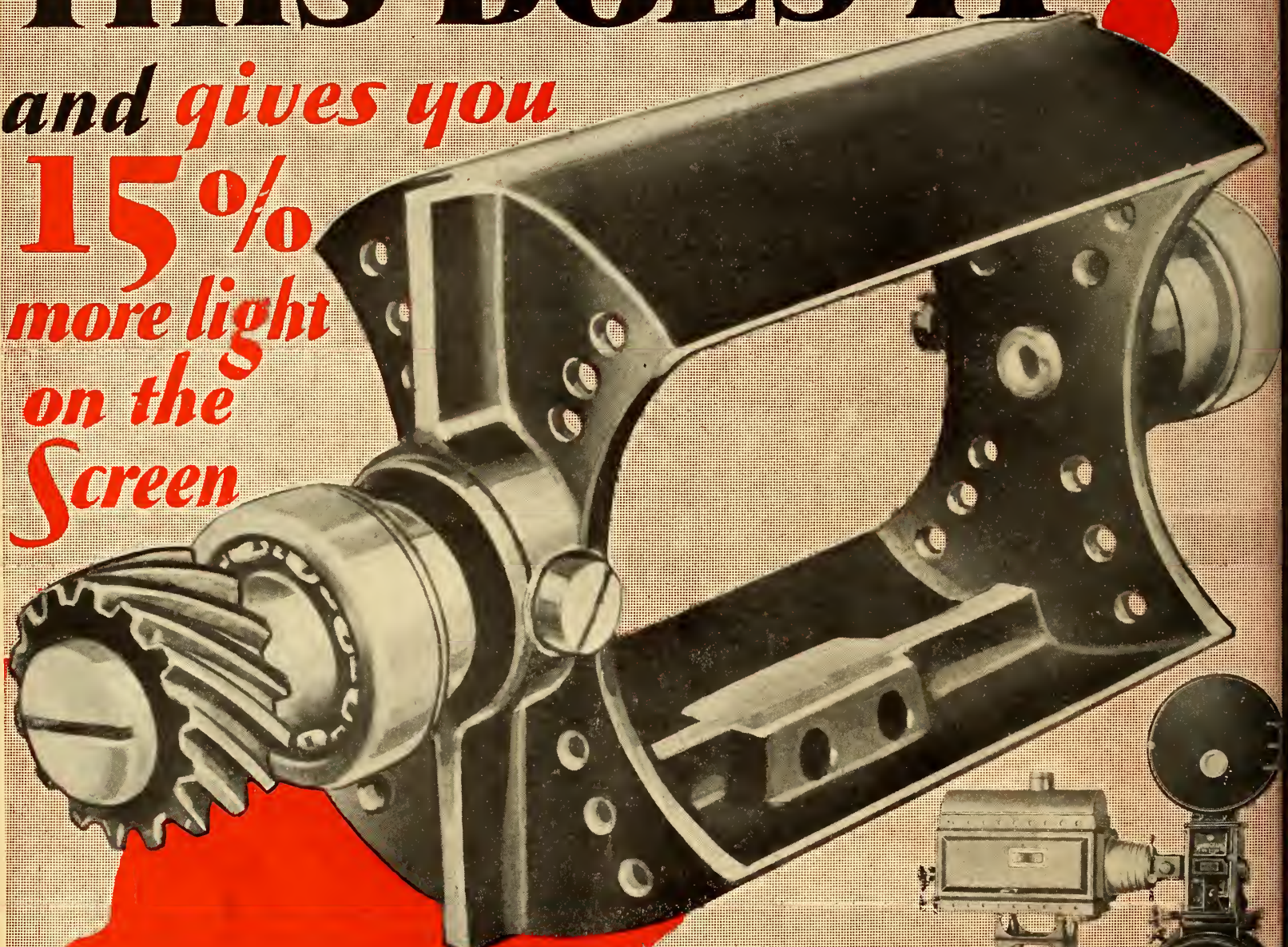
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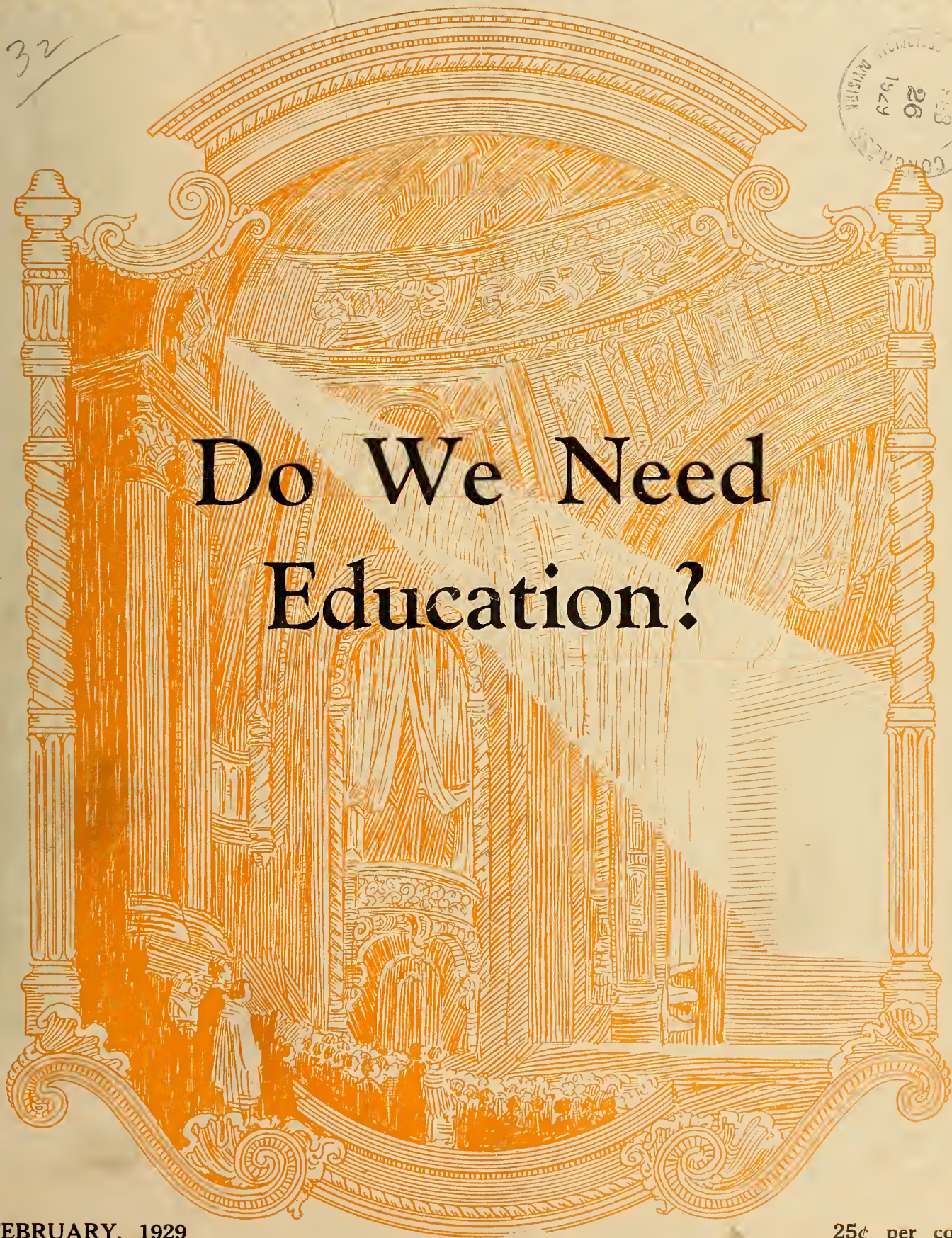
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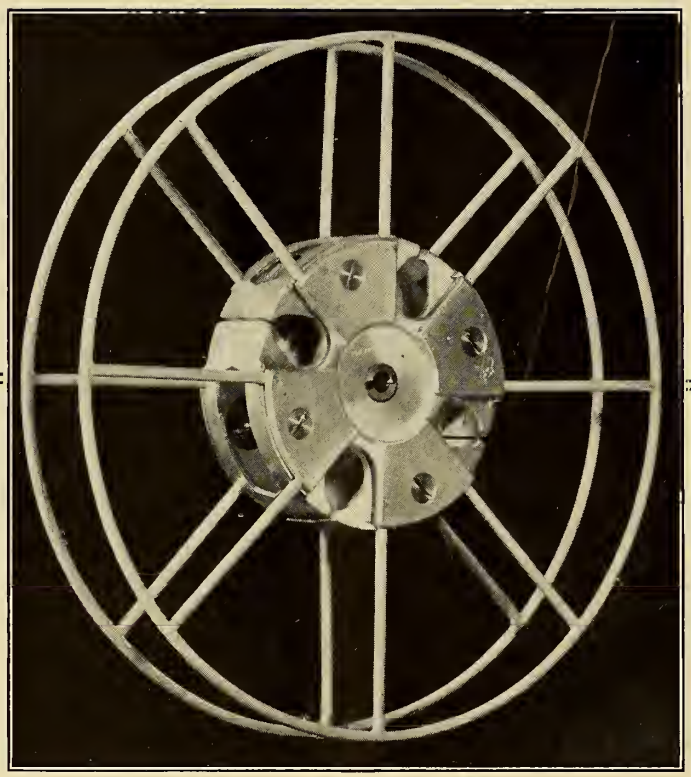
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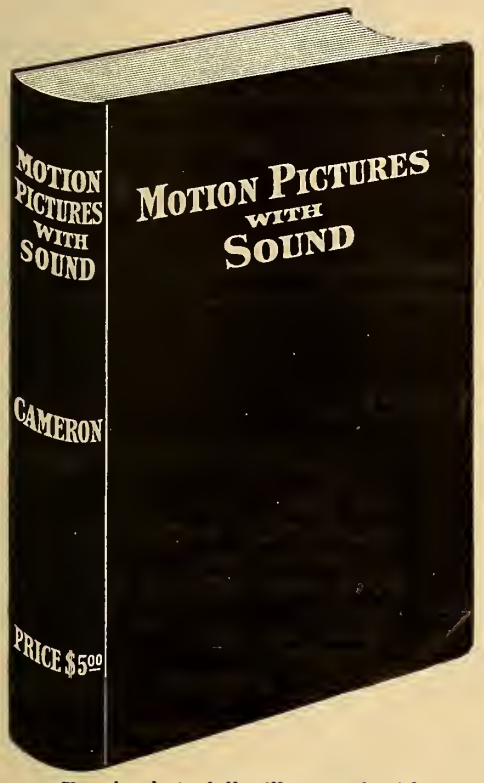
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THE MOTION PICTURE PROJECTIONIST

FEBRUARY, 1929 The Motion Picture Projectionist, 45 West 45th Street, New York Vol. 2—No. 5

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To Charge Exhibitors for Damaged Film

FILM mutilation is a serious problem wherever pictures are shown, and the evil continues to become more serious with each passing season. A recent statement by the secretary of the Australia exhibitors' association is illuminating in that it points the way for the industry to abolish, or at least check, the nuisance.

Incorporated in this statement was the charge that projectionists are responsible for the majority of damage; but the Australian film paper, *Everyones,* published many opposing viewpoints. The association's statement, in part, follows:

" . . . It is unmistakably clear that the condition of film generally is worse today than it was two years ago. In many cases exhibitors receive their programs with leads, tail-pieces and titles entirely missing. *There can be no denying the fact that this is due entirely to carelessness and negligence of projectionists."* (This statement was subsequently modified.)

"Whilst doubtless in some cases the damage to film is caused by the unsatisfactory state of biograph machines, a great percentage of damage is, by our experience, caused through careless rewinding, and it is in this respect that we would ask all exhibitors to exercise a greater amount of supervision over their operators than they are doing at the present time.

"Therefore, please report to the exchange concerned, any damage and deficiencies of leads, etc., BEFORE YOU SCREEN THE PICTURE (ordinary wear and tear excepted).

Exhibitors Must Pay

"Exhibitors frequently say that they dislike reporting to the exchange when film is received in bad condition because they don't wish to get the other man in trouble. In future, those exhibitors must run the risk of hurting the other fellow's feelings **or of taking the blame themselves, for all removal of leads, etc., and all damage to film, when proved, will be made and enforced."**

Whether or not the above statement is correct in attributing all damaged film to the carelessness of projectionists is unimportant. The interesting part of the statement lies in that section which provides for a very definite penalty for damaged film.

Similar action in this country would be welcomed by those conscientious exhibitors who are really interested in solving the bad film problem, and would in addition put a stop to the flow of language on the subject which is utterly worthless without accompanying action.

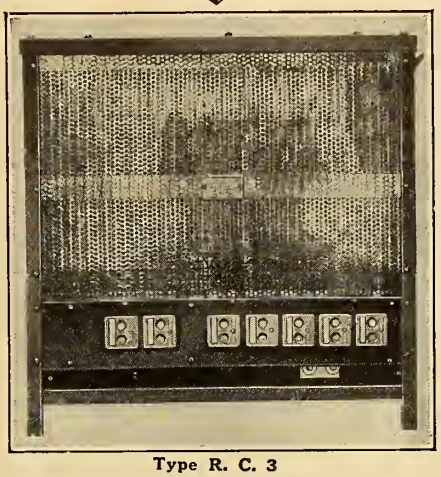
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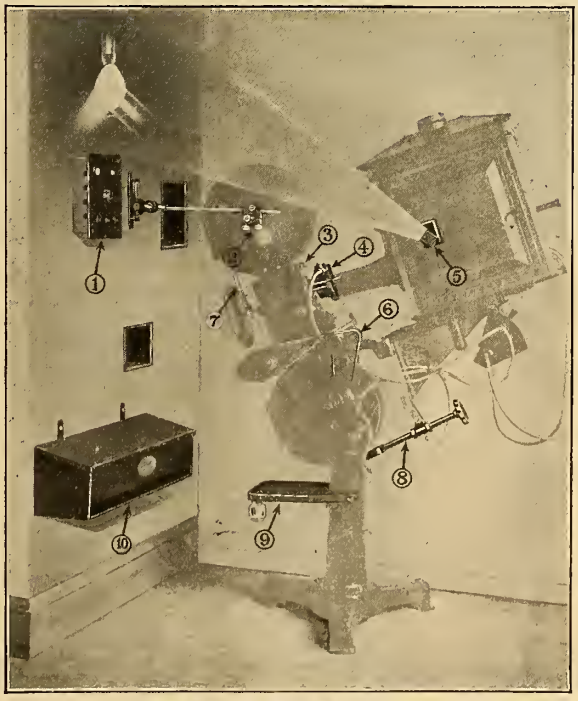
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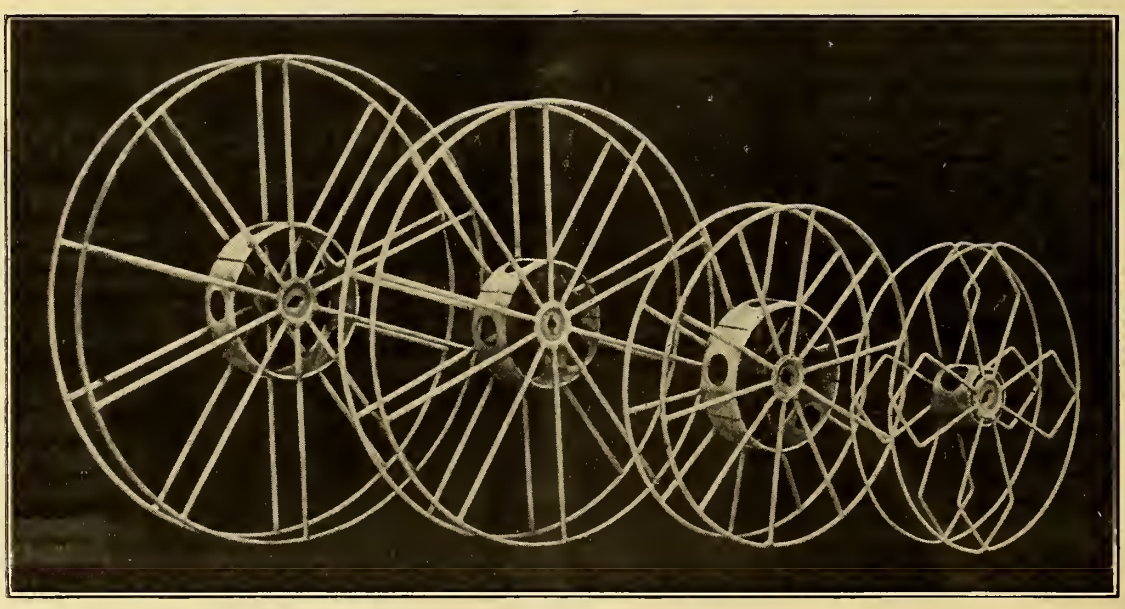
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Motion Picture Studio Lighting

By E. W. BEGGS
Engineering Department, Westinghouse Lamp Company

MOTION picture studios are at present almost entirely lighted by a combination of mercury vapor, carbon and flame arc lamps. However, recent developments in the motion picture and the incandescent lamp industries have so changed conditions that within two years—possibly less—all studios are expected to use Mazda lamps exclusively for illumination.

Motion picture film which has a sensitivity similar to that of the human eye is being produced and used in great quantities. It is called "panchromatic," because it reacts to all colors of the spectrum. It quite accurately reproduces in black and white tones the natural appearance of colored objects. The texture of the skin especially is more faithfully recorded and the elaborate make-up formerly used by the actors is not needed. Also, for the production of pictures in color "panchromatic" film or its equivalent is absolutely necessary.

For best results with this film, its manufacturers recommend Mazda lamps exclusively for several reasons. First, their light contains the colors of the spectrum in proportions similar to daylight. Second, it is rich in red, which compensates for a somewhat lower sensitivity of panchromatic film to light of that color. Third, the light of a Mazda lamp is constant in brightness and in color, which eliminates flicker so noticeable when arc-types of light sources are used.



Sound Compelled Change

One of the outstanding recent developments is the sound picture. It is impracticable to record sound with sputtering arc lamps nearby, due to electrical interference with the microphone circuit. Lighting with incandescents eliminates this difficulty, so that other types of light sources are rarely used in studios doing sound recording.

Competition in the motion picture industry has demanded that the wasteful methods used in the past be changed. The maintenance and manipulation of arc lights is very costly, whereas data compiled on the use of the incandescent shows that important economies are thus effected. Mazda lamps operate equally well on alternating or direct current, which circumstance simplifies the power problem, and they may be dimmed, while the other light sources must be operated continuously at full brightness.

Then too, simple portable illuminameters can be used with Mazda lamps to obtain a quick and accurate measure of the luminous intensity on the subject, which is approximately proportional to the photographic intensity of the light. The ratio does not hold with the other light sources used, so that with them there has always been some doubt as to whether or not the set was suitably illuminated.

During the past year there have been changes made in Mazda lamps which fit in very well with the plan. Our lamps have become more and more efficient and larger units have been made available. Now 10 K. W. lamps which appear to meet with favor in the motion picture studio, may be quite readily obtained and give consistent performance. For the present, lack of special fixtures is the most serious drawback, but lighting equipment designed for other types of service is adaptable to motion picture studio work. Also, in many cases, fixtures now used with arc lights can be quite readily chang-

(*Continued on page* 30)



The illustrations on this page show typical examples of motion picture studio lighting

Practical Data on Public Address Amplification

By McMURDO SILVER
Silver-Marshall Co., Inc.

A DAY never passes which does not bring to the desk of the writer at least one inquiry from a professional setbuilder, service man, engineer, school, hospital, theatre or manufacturer, seeking, not only quotations, but general information on power amplification systems suitable for group coverage. With the possibly selfish motive of obviating a considerable volume of personal correspondence the main purpose of which has been to convey a general idea of public, or group address systems to correspondents, the material herewith has been gathered together. It is hoped that it will be of assistance, even if one important underlying idea, the profits to be made by qualified professional setbuilders and service men from "P. A." sales and installation work, appeals only to a small portion of all readers.

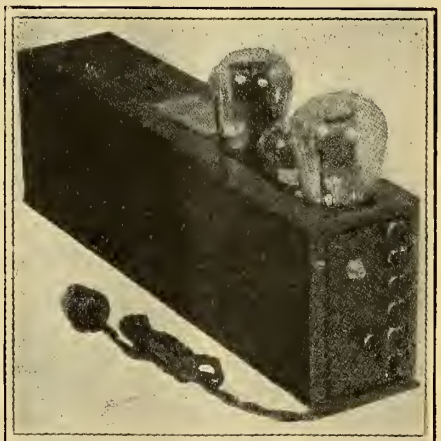


Fig. 1. A compact socket-powered amplifier with one '26, one '50, and one '81 tube.

Classification as to Requirements

In the same mail in which one correspondent will inquire about a pushpull amplifier using, perhaps, four 250-type tubes to cover a 500-seat theatre, another writer will ask for a system, to cost, maybe one hundred dollars, capable of covering possibly 15,000 people out-of-doors, so scanty seems to be popular knowledge of the equipment, and its approximate cost, required for given classes of service. Usually, however, the whole problem of such service seems to be visualized from the extremes of undersize receiving amplifiers, or oversize transmitting tubes not particularly suited to audio amplification and "giant" horns, as well as from all possible intermediate viewpoints.

Public or group address systems may be conveniently divided into three sections, (a) input apparatus, such as microphone, radio set, or phonograph record pickup; (b) vacuum tube amplifying equipment; and (c) loud speakers, or sound projectors. If voice coverage only is required, the whole system should have a substantially flat frequency characteristic time from about 200 to 2,000 cycles, whereas for really high quality music, as from radio or record input sources, the flat frequency range should extend from 80 or 100 cycles up to at least 4,000 cycles, possibly higher.

In other words, all frequencies within these ranges should pass through the system with substantially uniform amplification. The power output of the system should be sufficient to give the coverage desired, while the overall amplification should be sufficient to boost the weakest signal input to be encountered in practise to the full output of the system. It seems well to risk being accused of placing the cart before the horse, and to start at the output end in an attempt to clarify these requirements.

It has been found experimentally, and confirmed in a number of tests and installations that, assuming a frequency characteristic flat from 80 to 4,000 or 4,500 cycles, a power of 400 to 700 milliwatts delivered to an average reproducer is adequate to provide home entertainment at volume levels giving a natural impression; from 700 to 800, or possibly 1,000 milliwatts (1 watt) seems desirable for dancing in the average home. These figures apply equally well in practise to magnetic or dynamic speakers for home, schoolroom, or apartment use.

For auditoriums and theatres seating from 500 to 1,000 people, with all seats occupied, from 3 to 5 watts delivered to one or two reproducers will produce an impression of natural volume, replacing an orchestra quite effectively. Systems delivering about 5 watts to two reproducers give adequate coverage of 1,000- to 2,000-seat theatres. For houses of from 2,000 seats up, higher powers are needed; from 15 to 30 watts delivered to from four to eight speakers being desirable to insure safe reserve capacity for 3,000- to 6,000-seat houses. The above figures contemplate indoor operation, under draped or damped surroundings, and in practise give an impression of naturalness, but not of deafening, ear-splittig volume; rather, a volume level at which music or speech may be listened to with enjoyment.

For outdoor operation, good coverage of crowds of from ten to fifteen thousand people can be had with 5 watts, delivered to from one to six speakers, while 15 watts will make coverage more effective, and allow a reserve for unfavorable absorption conditions such as might be encountered in portable work. Thirty watts appears sufficient for crowds of from ten to twenty thousand or more people, depending upon grouping and absorption.

Accepting the above power figures as a practical guide, the problem is, what type of loud speakers or projectors to utilize for different classes of service to most effectively utilize these powers. One of the first considerations is whether microphone, as differentiated from radio or record input source, is to be employed. If

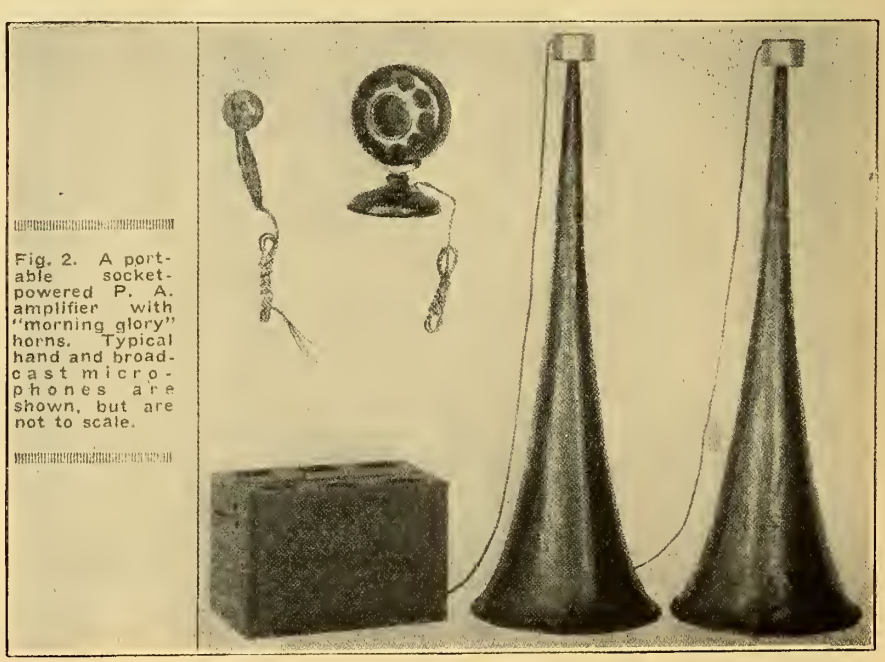


Fig. 2. A portable socket-powered P. A. amplifier with "morning glory" horns. Typical hand and broadcast microphones are shown, but are not to scale.

a microphone is to be used, as in a church or auditorium, to pick up a speaker's voice, which is to be amplified for the benefit of listeners in the same hall in which the microphone is placed, it is essential that the loud speakers be shielded, and project the amplified voice away from the microphone. Reaction between speakers or projectors will cause "singing," and, in the final analysis, the amount of "gain" or amplification that can usually be employed is determined by such reaction.

For voice alone, projectors with a good frequency characteristic from 200 to 2,000 cycles will be satisfactory, but they must be of a type to project sound away from the microphone, to the audience. Horns, therefore, of the "morning glory" type, are usually preferable when "mike" and loud speakers are in the same room. or out-of-doors, where reaction between them is possible. Where reaction is not possible ("mike" shielded from loud speakers, as when in another room), projectors of a less directional type are preferable, since better frequency characteristics can usually be had with such types.

Radio and Record Reproduction

For radio or record reproduction of music and voice, loud speakers giving greater diffusion are preferable. So-called airchrome, cone, or coiled exponential projectors are satisfactory, though public opinion seems at present to favor dynamic reproducing units in large baffles. In general, dynamic or air-chrome speakers seem preferable, with large air-column types comparing very favorably.

The number of projectors to be used depends upon the area to be covered and the power that the individual projectors

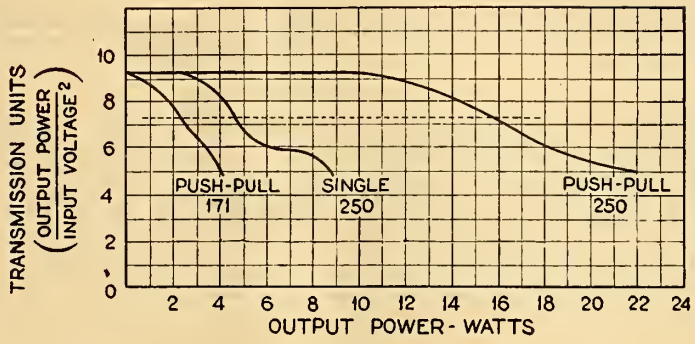


FIG. 4

Curves indicating the relative undistorted power outputs obtainable in practise from standard power tubes. Only the portion of the curve above the dotted line should ordinarily be used as distortion becomes serious below this point.

can safely handle without serious distortion or actual damage. For home reproduction, involving amplifier outputs of 400 to 1,000 milliwatts, almost any good speaker can be selected to suit personal taste. Air-chrome speakers or dynamic units in baffles 16 to 30 inches square are excellent, and will handle the power involved nicely. For radio or record reproduction in a theatre or auditorium seating up to 500 people, or possibly 1,000, with amplifier outputs of 3 to 5 watts, one good dynamic unit in a 40-inch square baffle is usually more than adequate; one large air-chrome (36-inch square) speaker is sometimes satisfactory, though many of the linen diaphragm speakers are equipped with woefully inadequate driving units and it is usually best to employ two. Air-column horns, such as the one referred to above, are often satisfactory. Two dynamic projectors are generally sufficient for 1,000- to 2,000-seat houses, when fed from a good 5-watt amplifier.

For microphone operation "morning glory" horns or other air-column speakers are best—two or three for 500-seat halls, and about four to six, or even eight, for 2,000-seat halls.

Microphone Operation

A good rule of thumb is to allow so many watts per speaker. One (two at the most) can be allowed for small air-chrome type speakers or small air-column horns, such as "morning glories." Two to possibly three watts can be allowed for large linen diaphragm speakers.

Dynamic units in small baffles (under 20 inches square), are not economical for group address service and their use should be discouraged in favor of dynamic units in large baffles (36 to 40 inches square). Two to four watts can be allowed for large baffle dynamic projectors. These ratings, which may be considered conservative by some, generous by others, have been found to be good guides in practical installations.

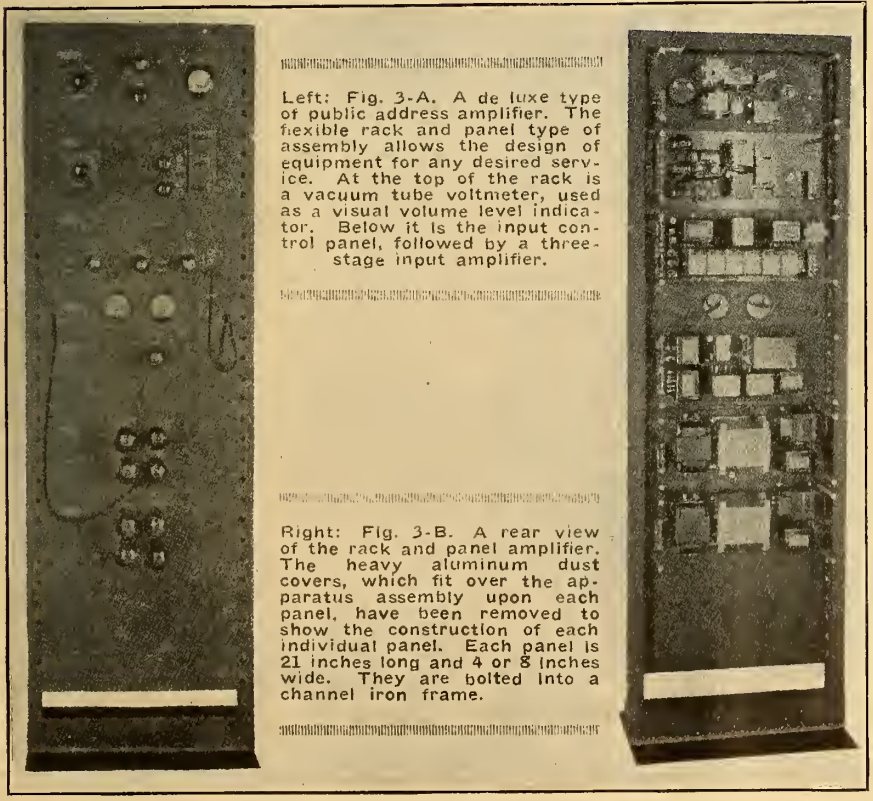
From the foregoing data any serviceman can estimate the power required for a given group address installation, and choose the approximate number and type of projectors need to give the desired coverage. The selection of amplifier and input apparatus remains to be made.

Selection of Tubes

For home use, involving powers of 400 to 700 milliwatts, an amplifier using one 171 output tube operated at maximum rated voltage is usually adequate. If greater power is required, two 171's in push-pull will give a maximum output of 2 or more watts if efficiently operated. One 210 would give a maximum of about 1.5 watts; there seems little or no justification for using 210 tubes, singly or in push-pull, since one 250 tube will develop as much undistorted power as two 210's in push-pull, while two 171's at low voltages are preferable to one 210 tube at maximum rated voltages. One 250 tube will develop about 4.6 watts; two in a good push-pull amplifier about three times as much—actually about 15 watts. Power output curves are seen in Fig. 4, taken on actual operating output stages.

Maximum allowable distortion can be conservatively taken as 2 TU's down; useful operating ranges are above the dotted line for each curve. There is some question as to how far they may be exceeded; this must remain for individual decision. Of course, these powers can only be obtained when load conditions are optimum; projectors must be connected to amplifier

(*Continued on page* 24)



Left: Fig. 3-A. A de luxe type of public address amplifier. The flexible rack and panel type of assembly allows the design of equipment for any desired service. At the top of the rack is a vacuum tube voltmeter, used as a visual volume level indicator. Below it is the input control panel, followed by a three-stage input amplifier.

Right: Fig. 3-B. A rear view of the rack and panel amplifier. The heavy aluminum dust covers, which fit over the apparatus assembly upon each panel, have been removed to show the construction of each individual panel. Each panel is 21 inches long and 4 or 8 inches wide. They are bolted into a channel iron frame.

Simplex
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EUROPE'S LARGEST AND MOST PALATIAL MOTION PICTURE THEATRES SHOW THEM THE "SIMPLEX WAY"—AND HOW!

Special Exclusive Article to the "American Projectionist"

By PETER H. GRIFFITHS
British Representative to the "American Projectionist"
(Member Society of Motion Picture Engineers and Projection Advisory Council)

The opening of the "NEW EMPIRE" and the "REGAL" Theatres, London's latest and luxurious "Super Cinemas" marks the advent of a new era in projection installations in Great Britain and the Continent.

The projection rooms of each of these theatres hold a battery of F O U R "SIMPLEX" projectors equipped with high intensity lamps.

The "NEW EMPIRE" Theatre is controlled by Loew's, Inc., and will be their premier European house, since they have disposed of the "TIVOLI" to the P. C. T. Circuit. The "NEW EMPIRE" is modeled closely on the lines of Loew's State, New York City, and Metropolitan, Boston, and is lavishly decorated and luxurious in its appointments.

The "REGAL" is privately owned, but in comparison there is little to choose between the two theatres, both are magnificent theatres and have been built and equipped at a huge cost which will set a standard and form an example for other exhibitors who contemplate new supers to follow.

The erection of both houses commenced within a few weeks of each other and both have in turn set the pace. During the last three months of completion, work has been carried on in feverish haste in the race to be the first to open to the public. In spite of this rush nothing has been skimped and no expense spared in their efforts to out-do each other, especially with regard to the electrical, stage, and projection equipment. The choice of "Simplex" projectors was the "EMPIRES" from the commencement and it was this predominating factor which led the "REGAL" management to ultimately choose "Simplex" also, for they realized that if this projection equipment was the choice of the "NEW EMPIRE" then it must be *the best* for nothing but the best was good enough for the Loew house; and so, the "REGAL" became "Simplexised" in spite of the fact that a few months before it had been stated that all British equipment was to be installed and used in every section of the theatre.

To shorten an otherwise long story and deal with the projection end of it, suffice to state the "NEW EMPIRE" opened first featuring "Trelawny of the Wells," "Sandy" McPherson at the console of the gigantic "WURLITZER", Don Albert and his orchestra and "Movietone" items.

The "REGAL" opened two weeks later with the premier European presentation of "The Singing Fool" a la "Vitaphone" for which it is fully equipped. With regard to the projectors, whereas the "EMPIRE" houses Model "M" Simplex those installed at the "REGAL" are Model "A".

The "EMPIRE" is equipped for "Movietone" presentations and the "REGAL" fully equipped for both "Movietone" and "Vitaphone" presentations.

The accompanying photograph shows the excellently equipped projection room of the "REGAL." The battery of "Simplexes" are fitted with latest automatic high intensity lamps; two of the four—those in foreground of photo—are fitted with "Vitaphone" and "Movietone" apparatus. The photograph of the "REGAL'S" equipment should be of great interest to American projectionists in that it will give them an opportunity to compare high class British cinema installation work with their own.

The "NEW EMPIRE" and the "REGAL" projection room installations convincingly testify to the superiority of the "Simplex" projector in theatres where the demand is for perfect projection and a performance of outstanding merit.

In theatres where nothing but the best is good enough, for silent picture projection or for sound film presentations, "Simplex" are the choice of the discriminating exhibitor—in the U. S. A., in Canada and now in Great Britain.

And so two more "supers" are added to the long list of London's "Simplexised" super shows, which include the "Plaza," "Astoria," "Piccadilly," "Tussards," "Rialto" and "Broadway."

Simplex
TRADE MARK PAT'D

INTERNATIONAL PROJECTOR CORPORATION
90 GOLD STREET, NEW YORK

This Matter of Volume Control*

By CARL DREHER

Vice-President, RCA Photophone Co.

SOME years ago an eminent progressive, being asked in a locality noted for repeated industrial warfare what he thought of law and order, answered to the effect that he thought it would be all right, but he had never seen any. Exaggeration often points the way to truth. The truth about volume control in the sound-movie field is that in most theatres there isn't any. This is probably the most serious defect in the technique of audible photoplay reproduction at the present time. The theatres, in this matter of gain adjustment, are now at the stage in which broadcasting was in 1923, but the effect is worse, because the combination of sound reproduction with pictorial action presents more difficult problems than sound reproduction alone.

The principal faults may be summarized as follows:

(1) General level of speech reproduction too high.

(2) Failure of volume to follow the action or to maintain a natural proportionality.

(3) Abrupt jumps from one musical selection to another as scenes change.

(4) Inability to adapt sound reproduction to audience reaction in special cases.

Under the first count of the indictment, I may say that I attend a good many sound-picture showings in various cities and different sizes of theatres, and very rarely encounter inadequate volume of either speech or musical accompaniment. Excessive loudness of synchronized musical accompaniment I hear sometimes, but not often enough to write an article about it.

Too Much Volume

Unnaturally loud speech reproduction, however, is rampant. This generally excessive level of speech reproduction is caused by failure on the part of the recording experts, projectionists, theatre managers, and other functionaries to appreciate the simple fact that speech is usually not as loud as music. So, in changing from orchestral accompaniment to speech, during a picture, they ought to drop the level, perhaps 10 TU. But in most pictures which have talking portions alternating with music nobody does anything about this. The result is that even in the top gallery the speech is absurdly loud.

The setting should be such that in this location conversational speech from the sound movie machine is loud enough to be comfortably understandable. In a house with good acoustics this will not be much louder than speech of the same sort from an actor on the stage. Even when this rule is followed the speech may be too loud in the front of the orchestra, but it will not be as bad as when the level is excessive up above.

This chronic tendency to oversupply volume leads to a number of corollary defacts. One is a distortional change in voices. An actor playing a love scene, for example, and talking to a girl at close range, naturally speaks in a low voice. His low voice is not the same, in distribution of overtones, fundamental pitch, and other characteristics as if he were talking loudly. The recording operator, perhaps, brings up the gain control to get above the noise level of his equipment. Then in the theatre some more amplification is piled on, and the voice issues from the projectors a few million times louder than at the beginning. The ear recognizes the fact that something adventitious has happened to the man's voice.

Quiet speech sounds natural only when it is reproduced at a relatively low intensity. Furthermore, dramatic contrast is lost when even moderately loud sounds are reproduced heavily. If you deafen the audience with the amorous murmuring of the lovers, what more can you do when they begin to shout at each other, or when the hero pulls a machine gun out of his trousers and shoots one of his fellow gangsters? If you are working at plus 10 for sounds of low volume, and you emit 100 times as much energy for a louder sound, the effect on the ear goes up to plus 30, an increase of 200 per cent as far as the ear is concerned. But if you are already working at plus 40 the same ratio of increase only brings you up to plus 60, an increase of 50 per cent to the ear. The audiences, even though they don't know much about logarithms, have ears which act logarithmically.

Faulty Recording Responsible

Part of what has been said also has a bearing on the second point listed above.



Fundamentally, the failure to correlate volume with the action of the play is a fault in recording. Skillful gain variation in the theatre can make up for defects in recording, but what we frequently get is mediocre recording to begin with, aggravated by bungling in reproduction.

One of the faults frequently mentioned by critics of talking pictures is that when characters go backstage after a close-up there is no corresponding diminution in the level of their speech. This is something which should be taken care of in recording, but usually isn't. The close-up is one shot and the movement backstage very likely another. By the time the recording engineers are taking the latter they have forgotten the initial volume, but the audience, getting the two close together, notices the incongruity. The remedy lies in recognition of such defects, more utilization of instruments, and standardization of technique.

Battery of "Mikes" Harmful

Similarly when an actor turns away from the audience there is not the change in his voice which one would expect. The reason usually is that a second microphone was used to pick him up when he turned away, and the recording expert neglected to bring down the gain control somewhat on his transmitter to take care of its direction with respect to the future audience.

Some of the troubles discussed above involve refinements in technique and training of skilled personnel, which cannot be accomplished overnight, but such scandalous defects as abrupt changes in musical selections are inexcusable. As long as audiences tolerate such barbarities, it seems there will be producers and exhibitors foolish enough to perpetrate them.

In the meantime other producers will refine their technique and sell the product to the more far-sighted theatre proprietors; and when the public becomes critical the latter will get the business and the former will be left wondering why their seats are empty. As yet, unfortunately, the public has not become discriminating, and one sees audiences sitting through synchronized pictures in which, as the scenes change, one musical selection is abruptly broken off and another starts will full volume in the middle of a bar.

These are the subtle operations of the cutting room on sound film. As originally scored, the picture has appropriate musical selections fitted to the various scenes, with suitable transitions and pauses as scenes change. Further changes being decided on, pieces are chopped out of the reel. This may improve the picture (often it does), but unfortunately the sound track goes with the picture, and with it the artistic transitions arranged by the musical director. Of course, these portions

(*Continued on page* 20)

* Radio Broadcast, Jan., 1929.

As The EDITOR Sees It

¶ *Do We Need Education?*

DO we need education?

As much of it as we can get—and never did we need it as badly as at this time. Not only because projection equipment is undergoing radical changes but also because there are many new men in the craft who have not had the advantage of the years of preparation which pre-sound picture veterans have had. We have expressed this need of education before, and we are all gratified at the way the craft has tackled and solved its educational problems. But it is our duty to speak up against the apathy toward this important phase of our growth which still holds some of us in a fast grip.

Without education we cannot make progress. It is the price we must all pay for better conditions—for a greater prosperity—and since so much of our intimate happiness depends on the measure of prosperity we enjoy, then it is the price we must pay for our happiness also. We cannot expect a voluntary recognition and admiration from our employers except we arouse this recognition and admiration by the quality and expertness of our work and our preparedness to tackle and conquer successfully any new problems in projection that may be put before us from time to time.

As we have said before, this is directed not to the majority of the craft but to the small minority—groups to be found here and there who are deaf to all suggestion to arm—to arm by education, to prepare for better and more exacting jobs, more exacting equipment. The majority deserve nothing but the highest praise. It has already been freely admitted (not once but often, and by the highest authorities in the sound picture field), that without the projectionist sound pictures would have been a failure. By this they mean that the collective ingenuity, intelligence and resourcefulness of the craft successfully turned their rather crude sound equipment into enjoyable sound films before millions of satisfied picture-goers.

¶ *The Willingness to Learn*

THE mute minority have not lacked this ingenuity, intelligence and resourcefulness; but they have lacked the willingness to tackle the new problems. It might be described as either a colossal ignorance of the real events that are taking place around them and an inability to understand just what these events might mean to them in more dollars in their weekly pay envelopes, or it might be described as sheer laziness. But it is our hope that our repeated urging to the craft to educate will awake those who at present are ignorant of the real situation to join their fellow workers in the onward march.

The attention of the entire industry is focused upon us. From top to bottom they are all keenly aware of what Thomas Edison himself said in a letter to this publication almost two years ago:—"In the projectionists' hands is the power to make or mar the picture." The industry watches the premier of every production these days with the most feverish intensity and fear. The millions of dollars that are being spent today in big sound productions, from story to distribution, are all at the mercy of the projection crew in the projection room. An audience that has no concern with the huge investment or with the hopes and fears of its producers, sits below ready to praise or to criticize, ready to award success or to place the sign of failure. To this ultimate success or failure the projectionists contribute the greatest part.

¶ *Craft Must Depend on Itself*

THE education of the craft—the inspiration for education—must come from within our own ranks. There is little to be expected from the outside. Despite the most strenuous efforts of those interested in spreading education, little encouragement has been received to date from those from whom it was to be expected most. We refer to the manufacturers and distributors of sound picture equipment. Either because they fear to reveal their "secrets" or because they are too short-sighted to realize the value of educating the projectionist to the fullest knowledge of their equipment, they have so far failed to respond to any and all pleas for sound technical propaganda.

But though they fail to extend educational facilities they are nevertheless placing more and more new projection equipment on the market, a great deal of which ultimately finds its way into theatres in greater or lesser proportion. And we must *know* about this equipment, how to use it, how to get the best out of it.

We must therefore seek education ourselves. No matter how we get it, we must not allow ourselves to be caught unprepared. We must reach out ourselves and discover the facilities of education. We must open up channels through which this education may find its way all over the country, available to all who seek it. We must take advantage of everything that is offered, separating the good from the bad, and storing up a fund of knowledge from which, as it is demanded, we can select and apply to the problems at hand.

Fundamentals of Correct Room Planning

By M. D. O'BRIEN
Chairman, Committee on Projection Room Planning, Projection Advisory Council

Herewith is presented the first material published by the Projection Advisory Council, the organization of which was announced in last month's issue. The following article represents the first work by the Committee on Projection Room Planning. The work of other committees will be reported in detail in these columns from time to time.

THE motion picture industry is paying and will continue to pay for many years for the failure of architects, owners and builders to realize that the time to consider projection room designing is when the plans are on paper and not when the building is almost finished. It is far easier to consider projection room requirements on the plans than to have mistakes made which cannot be rectified, or to correct errors by expensive alterations. The history of errors of omission and commission in the planning of projection rooms is a long and interesting one and many specific instances could be given of the serious blunders that have been made. The blunders range from the failure to build any projection room at all, so that the opening of the theatre had to be held up for a considerable period, down through the thousands of more or less serious errors which are today a handicap to projection.

Lest I seem as a projectionist to overemphasize the subject, I will quote at length from an article in *American Cinematographer*, entitled "Build Theatres Around Projection" by Daniel B. Clark, President of the American Society of Cinematographers.

"If good projection is to be desired, the time to begin to provide for it is when an architect first begins to draw the plans for a new motion picture theatre—or legitimate house for that matter.

"Gone is the era when an orthodox theatre was converted into a cinema palace by tacking up a screen and finding a hole in the wall in which could be thrown the projection 'booth.' But do our theatre builders give ample consideration to the room that is to house the projectors?

"In a recent issue of the *American Cinematographer*, H. Lyman Broening, A.S.C., called attention to the bad throw in a Los Angeles theatre, to which fell the honor of presenting the important production 'Ben Hur,' to the film capital. It so happens that this is a comparatively new house, only a couple of years old. While it presumably was primarily designed for a legitimate theatre, it is reasonable to believe that the exhibition of motion pictures in an establishment, located as this is, was



M. D. O'BRIEN
Ass't Supervisor of Projection, Loew's, Inc.

well within the thoughts of those responsible for the erection and planning of the house. That an imperfect projection arrangement was created is lamentable.

"Yet this condition exists throughout the country today. Projection rooms are put in as more or less an afterthought. They are placed in a part of the house most agreeable to other considerations whether it be the general style of interior architecture which cannot be marred under any conditions or what not.

"But patrons do not come to a theatre to feast their eyes exclusively on the beauty of a house's interior. They come to see a picture—a good picture. And they cannot see such with imperfect projection. And there cannot be perfect projection, if the projectors must do all but walk around corners to get the images on the screen.

"Motion picture theatre architects have a duty that is greater than the mere designing of edifices that are pleasing to the eye. Their task is to design a structure in which motion pictures may be seen to the greatest advantage—which means nothing more than that it must be possible to project films at the greatest advantage.

Should Consult Projectionist

"If it is not a part of the equipment of such architects to know where and how to place such projection rooms, then it should behoove them to consult some competent projection engineer who is fortified with the necessary knowledge. In a word, the cinema house should be built around the projection appointments, rather than the latter's being built into the theatre.

"Those who erect theatres are in the key position. It is they who may insist not only that their houses have the best projection equipment obtainable, but that, in addition, this best equipment be provided at that place in the house most suited to maximum results. Mr. Theatre Builder, tell that to Mr. Architect."

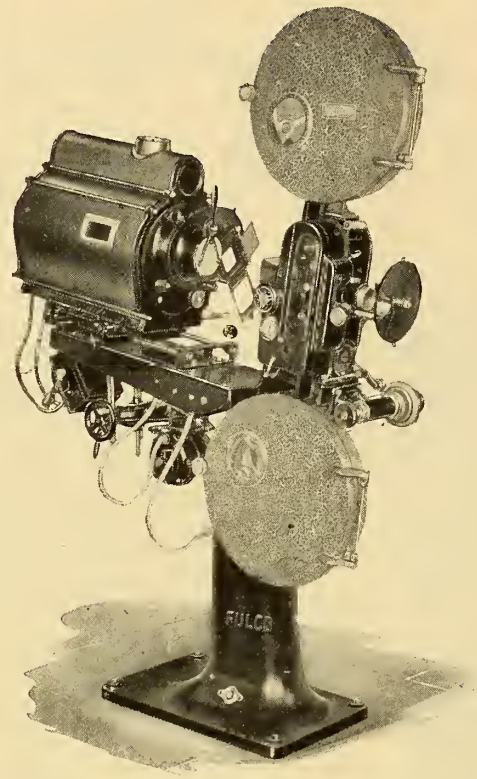
Do not lose sight of the fact that the whole show in many instances emanates from the projection room. The orchestra and organ are mere adjuncts and the "mural decorations, the wonderful lighting effects, the gold and blue lobby," etc., are only the frames to set off the picture to better advantage.

The theatre owner is a retailer of a highly popular form of public entertainment which must go through various chemical processes before it becomes the "merchandise" for which the public pays. The raw stock is made in Rochester, finished in Hollywood and, by means of the projector, carbons and lens is manufactured into the "product" which the public "consumes." Up to this point the money spent is frozen capital, the material valueless. The theatre is the building in which the "product" is sold and nothing should be overlooked to get the customer into the store and make him as comfortable as possible. But the owner must fully realize the vital importance of that little "factory" he is operating away up in the back of his theatre.

If the equipment, if the man in charge, if the facilities or the materials used are lacking the quality of the "product" will suffer. No good merchant need be told that it is his duty and to his lasting benefit to do everything to maintain the quality of the merchandise he sells to the public. Upon the success of the theatre owner every department of this industry depends.

"The Heart of the Theatre"

Not so long ago, the projection room in the motion picture theatre consisted of the housing around the projectors, sufficiently large for two "machines," and a man to "operate" them. Its sole purpose apparently was to conceal the machines or machine which was merely tolerated as a necessary evil. We all remember the familiar old slide, "One Minute Please to Change Reels," due to the fact that one machine was considered enough. Today the projection room is the "heart of the



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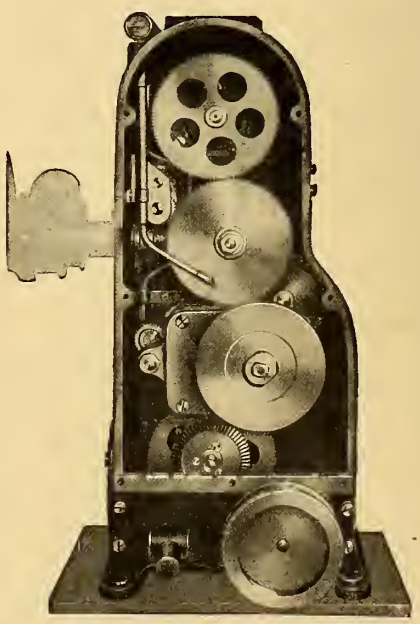
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NOTE SIGHT TUBE ON TOP OF MECHANISM. CIRCULATION OF LUBRICANT IS ALWAYS VISIBLE.

house," upon which the motion picture theatre depends for its existence and successful operation.

There are still a few exhibitors and quite a few architects, who are of the opinion that after the theatre is practically completed, some out-of-the-way place can be found to install two projectors and a spot light.

This, however, is a great error, as there are so many facts to be taken into consideration, that no one man is capable of properly locating the projectors and other equipment without hours of careful study of the individual characteristics of each theatre.

For instance: How many seats will the theatre contain? How wide will it be? How long? How high? How large will the Proscenium opening be? How deep will the stage be? How high above datum? At what angle would a patron in the front row be compelled to look at the picture? The back row? The most extreme right and left seats? Will people walking back and forth, obstruct the light rays of the projection room? Are there any mechanical obstructions to the light rays such as chandeliers and decorations? Will the decorations be of a character to pick up and reffect light rays to the screen or the patrons?

Selection of Equipment

Will the location of orchestra lights. chandeliers or bracket lights reflect light to the screen? Will there be any possibility of daylight reaching the screen? Will the size of the screen be commensurate with the dimensions of the house?

What type of equipment will give the best results, Incandescent Lamp, Mirror Arc Lamp, Ordinary Arc Lamp, or H. I. Arc Lamp? What type generator will give the best results with a minimum cost of maintenance? What type lens will be best suited to the particular theatre?

The kind of performance to be put on will raise the question of placing the screen or screens, also the necessary equipment in th projection room for the projection of lighting and scenic effects to the stage. Will stage lighting be controlled from stage or projection room? Will curtains be controlled from stage or projection room? Will house lights be controlled from stage or projection room?

Sound Presents New Problems

With the advent of sound in motion picture theatres, of course there are many more problems which will enter into the correct design of the projection room. Heretofore, we have not had to worry about the projection room being actually sound proof. But now we may have to materially change the design of projection ports in order to eliminate the undesirable feature of having the audience hear the monitor horns blasting through the ports. Again with the advent of sound, it became necessary to install the conduit system for the sound equipment in such a manner that it would be a permanent installation and not look like an afterthought.

This necessitated close cooperation with the organizations who were furnishing the talking equipment. New projection room standards were necessary in order to increase the space between the projectors and accommodate projection room for the sound equipment.

In view of the fact that this sound equipment is so very new and changes are occurring rapidly in the installations and design of same, it is necessary to keep in constant touch with the manufacturers and their engineers.

Only after considering a vast number of important details, is it possible to intelligently plan and design a projection room and recommend the proper projection equipment to be installed therein.

EQUIPMENT distributors should have facilities to handle all installation work to the most minute detail, including in their staff men who are thorough theoretical and practical electricians.

Draftsmen who are thoroughly familiar with projection room equipment and requirements.

Men versed in the study of reflection and refraction, and who are familiar with every type of screen and its characteristics.

Expert projector and repair and maintenance men, equipped with the most up-to-date tools to give quickest and most efficient projector repairs.

A corps of competent service men who can be reached at any hour of the day or night.

Men who specialize in theatre illumination, interior and exterior, stage drapery, and generator installation.

Repair men, electric wire men, both light and power, electrical instrument workers, experts on optics, as applied to motion picture projection. Illumination experts familiar with every known type of motion picture projector or arc or incandescent lamps.

Men familiar with requirements of projection port shutter design and construction, as well as projection room ventilation.

Men familiar with every type of motion picture projector from the professional model to the smallest toy projector.

Co-operation of All Concerned

The above serves to merely indicate the variety of work which must be taken into consideration before it is possible to plan the projection room and to illustrate to what extent equipment distributors can be of service to the exhibitor, architect and contractor, as well as to the projectionist.

At the earliest possible moment the architect should confer with the engineers of the equipment distributors, the supervisor of a circuit, the chief projectionist or a local projectionist of some standing. In some instances it would be advisable to consult the secretary of the Local of the I. A. T. S. E. of the territory in which the theatre is being erected. The plans of the theatre should always be submitted to a practical projectionist and after consultation with the owners the architect must receive directions which will enable him to properly prepare the floor plan of the projection room. The right time to do this is in the early stages of preparing the plans in order that the full requirements of the projection room may be considered before construction makes it difficult or costly to give the projection the proper size, location, etc.

After a decision has been arrived at, as to the type of equipment most suitable for use in the theatre, the engineer should get in touch with the architect who designed the theatre. He should acquire copies of the orchestra floor plan, projection room floor plan, and longitudinal cross section through centre line of theatre. These plans should be studied from each of the above mentioned angles, the distance of projection determined, the correct size screen decided upon, and the angle of projection worked out.

This necessitates quite a little bit of mathematical calculation and geometric drawing, and should not be left to mere guesswork or to someone relying on a keen eye to determine the proper angle of projection.

Abolish Hit-or-Miss Methods

A case is known in which a man working in a projection room for twelve years was under the impression that his projectors were setting at an angle of approximately thirty-six degrees. This was an error, as a protractor measurement showed exactly eighteen degrees.

A very careful and thorough study should be made of the cross section plan to determine whether there is any likelihood of the iron construction, or the decorations interfering with the sight lines from the projection room to the stage.

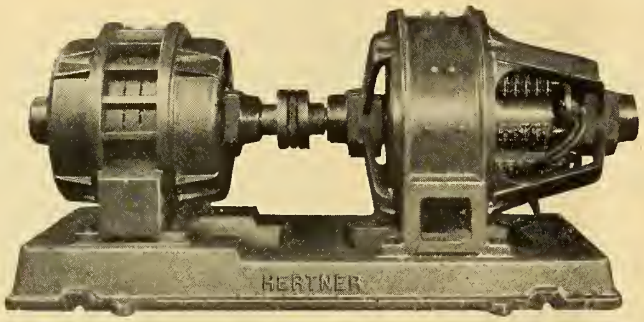
The seating arrangement should then be carefully studied, to ascertain positively whether there is any possibility of the seated or moving patrons interfering with the projection ray. The placing and size of the screen are also to a considerable degree dependent upon the seating arrangement. For instance, a large screen placed close to the first row of seats would subject the eyes of patrons to serious optical gymnastics in order to take in the entire picture. This is one of the causes of eye strain. Again, placing of the screen relative to seating arrangement may determine the type of illumination to be used on the projectors, as too great a screen brilliancy will cause eye strain from the front seats or from certain angles.

The next problem in planning the projection room is to determine the height of the projection ports, which is governed mainly by the angle of the projector light rays. The actual layout is now ready to be incorporated in a drawing. The lens ports are laid out so that the center line of each projector will be equi-distant from the center line of the theatre. In case of three projectors the center one will be directly on the center line, and the other two on either side of the center line. The placing of the projectors should be so that a minimum distance between them will permit comfortable working space, and a maximum distance which will not create too great a keystone effect in the picture.

Planning the Ports

We are now ready to lay out the observation spot light and dissolver ports. The projection angle will also determine

(*Continued on page 26*)



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Publix Associates Honor Rubin at Dinner

THE members of the Publix projection staff gave a dinner on February 12th to their "Chief" Harry Rubin, Supervisor of Projection, Publix Theatres, and presented him with a very handsome token of their good will. Presentations were also made to Jesse Hopkins and Rudolph Miehling, Assistant Supervisors of Projection, and W. A. Woodfin, Secretary. In accepting Mr. Rubin laid stress on the growing



Harry Rubin

importance of the projectionist and the need for constant study. He pointed out the probability of the entire show emanating from the projection room.

Mr. Rubin said that an understanding of showmanship was just as important as technical knowledge for projectionists in the large motion picture theatres. Scenic novelties, understanding of colors and sound effects are just a few of the things upon which the projectionist must have much practical information. It is absolutely necessary for him to keep thoroughly posted on the changes from day to day.

The invited guests were, from Local 306, Simon Terr, Business Agent; Charles Eichhorn, Vice President; M. Sternberg, Assistant to President of 306; and P. A. McGuire, Advertising Manager, International Projector Corporation.

Howard Paxton was the toastmaster and the committee in charge, Bert Popkin and David Lazar, are entitled to credit for one of the most successful affairs given by New York projectionists this winter.

New Power Ratio Designation

Power ratio has heretofore been expressed by the letters TU (transmission unit), which meant the Transmission Unit of Loss or Gain. This term has been supplanted by a new unit, the Bel and decibel, which means the same thing, and which will be expressed as DB.

A New Kliegl Spot

A HIGH INTENSITY long-range spotlight for use with incandescent lamps projects a concentrated beam of light any distance up to 100 ft., gives a 3-ft spot, or a wire spread; and is used in the studio for: back lighting—to give depth to the picture, cross lighting—to eliminate facial shadows, intense spotlighting, follow-up floodlighting, modelling, and for special lighting effects; accommodates a 2000-watt concentrated filament G 48 Mazda lamp, and operates on 110-120 volts, alternating or direct current.

Spotlight is flexibly mounted on a telescopic pedestal stand; can be set at any angle, raised, lowered, or turned in any direction; and the base is fitted with casters permitting it to be rolled easily over the floor.

Lamp housing, 22-inches in length, is light-tight, thoroughly ventilated and substantially constructed—with framework of cast aluminum, and sides of rust-resisting Russian iron. It is equipped with: an eight-inch condensing lens—so supported as to allow unrestricted expansion of the glass to avoid breakage; a mogul-screw-base receptacle—mounted on a sliding base, with a vertical adjustment for centering the light source, and a rod extending through the rear of the housing for focusing: a concave chromium-plated reflector mounted back of the lamp to insure full utilization of the light source and to intensify the light beam; a large self-closing spring door—on one side of the hood which permits easy access to interior for changing lamps; and slide grooves—on the front of the hood for holding iris shutter or other devices used in obtaining special lighting effects.

Spotlight is furnished complete with telescopic stand; asbestos leads, enclosed switch and 25 feet of stage cable.

RCA Projector Now On Volume Production Basis

Plans for putting the RCA projector into production on a large scale have been perfected, according to RCA Photophone Co. officials, who state that this work will proceed rapidly henceforth.

With more than twenty projectors having been installed in theatres in Eastern States within the past few months, the few changes suggested by their operation have been incorporated into the design for future production of the machine. Production work is now progressing rapidly and contracts for installations are being received daily.

RCA Photophone officials express themselves as gratified at the performance of their projector, pointing out that within a few short months the machine has proved itself capable of quality work of a type matching their highest expectations. Further, they point out, the very few changes suggested by the operation of the projector within the past few months proves the excellence of its basic design. The minor changes made, say RCA officials, will make the projector perfect in every detail.

F.S.C.

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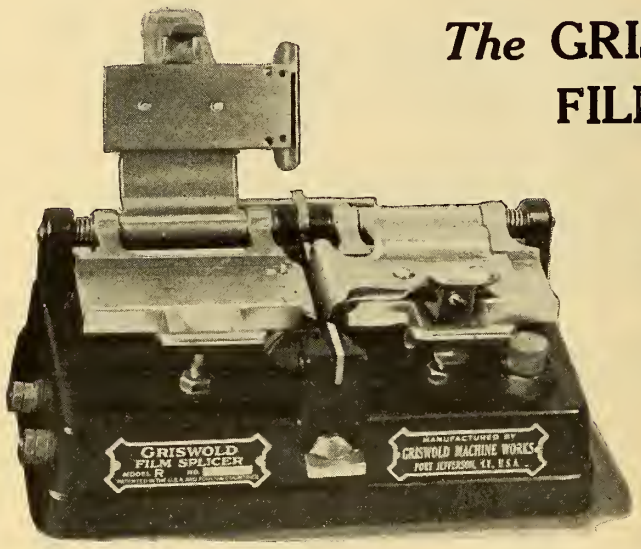
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Small wonder that this lens has received such an enthusiastic reception from operators everywhere, and that this lens is hailed as the most outstanding advance in projection optics in years.

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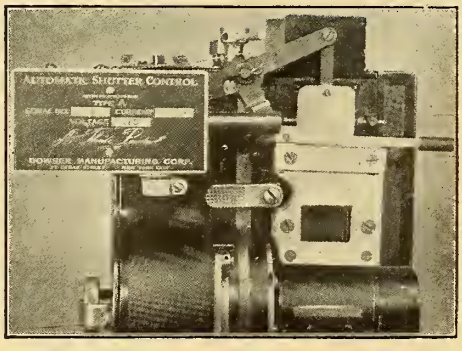
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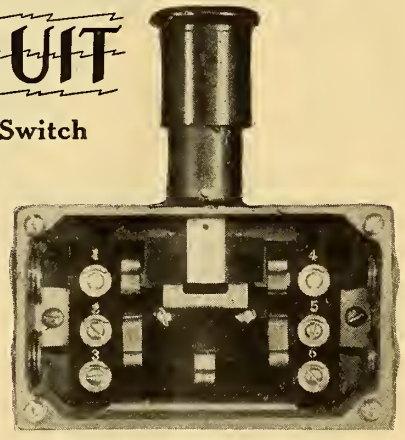
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Important Points on Sound Operation

GENEROUS space has been allotted in these columns to various important points to be remembered in connection with the proper operation of sound picture equipment, with particular emphasis having been placed on those phases of operation which have to do with proper volume control, emergency procedure and correct handling procedure. Of late, complaints on the poor quality of reproduction presented by many of the leading theatres in the country have caused the sponsors of the various sound devices to renew their efforts to get the widest publicity possible for correct operating procedure.

Most of the complaints hinge on the matter of volume control which circumstance may be due to the inability of the theatre management to correctly gauge the acoustical requirements of his theatre, to faulty recording or to careless work in the projection room. Whatever the cause, the last-named is no excuse at all.

It is desirable, therefore, that particular attention be given the following information supplied by Electrical Research Products, Inc., installation and servicing agents for Vitaphone and Movietone:

In order to give satisfactory performance with synchronized presentations, *adequate rehearsal is necessary.*

When the motor is up to speed at the start of a reel, bring the fader up SLOWLY so that it reaches correct setting just before the voice or music begins. (This needs rehearsal). Motors used with this equipment require 4 or 5 seconds to speed up, because of the heavy flywheel required. NEVER move fader from zero before motor has reached full speed, as this will completely spoil beginning of music or speech. If sound begins before motor has finished speeding up, add leader to the film as required.

Fader Most Important

The fader must always be kept at zero when the house is open, except when testing with all theatre horns turned off, or when voice or music is actually being reproduced, with the motor up to speed. This is necessary (a) to avoid the record surface noise or film noise being noticed; (b) to prevent the possibility of noises being heard from the horns at times when the pick-up equipment is being handled (c) to preclude the voice or music being heard in distorted form when the motor is speeding up or slowing down, in case it has to be stopped during a reel from film breakage or other cause.

When making a changeover move the fader as smoothly as possible, and if you cannot make a complete changeover in one movement, stop at ZERO for a fresh grip. Be careful not to overshoot the setting and then have to come back to it.

If the installation includes disc pick-up, always keep the reproducer in the rest except when a record is set up.

Under no circumstances is it permissible to run pictures with synchronized voice or music at any other speed than

(*Continued on page* 31)

A BOOK ON SOUND!

by

Showing *ALL* Sound Systems



Mr. RUDOLPH MIEHLING

Over 100 Illustrations

Mr. Rudolph Miehling is a nationally-known figure in the world of projection.

He is a graduate of Columbia University, holding an engineer's degree. Prior to his entrance into the motion picture industry he was on the staff of several of the country's most famous electrical engineering corporations. For years before sound became a commercial fact, he fought for the realization of sound with pictures and made many experiments to prove his contentions.

With the formation of the Electrical Research Products Corporation, (Erpi) he was made Chief Installation Engineer, his knowledge of the practical requirements of projection making him one of the most valuable members of the staff of this company. He was taken away from Erpi by Publix as soon as this company decided to go into sound and appointed Advisor on Sound Projection for the Publix Circuit with the whole country as his laboratory. He has the respect of the whole sound picture world.

From this it may be seen that no one in the motion picture industry today can speak with greater authority on sound and sound problems and the operation of sound equipment, than Mr. Miehling.

Mr. Miehling has personal contact with all research and laboratory work now going on in the United States on sound and brings to his book a vast knowledge of actual and theoretical work that will shortly be realized commercially and placed on the market.

Mr. Miehling has written this book from the viewpoint of a practical projectionist.

He describes all existing sound systems with wiring hookups, methods of operation, etc.

He gives full details of amplification, recording and projecting under all conditions in all kinds of theatres.

He lists all the common problems of sound projection and gives careful instructions on how to overcome them.

He lists over 100 illustrations showing details of each system, getting at the insides of them, to enable the projectionist to better understand his equipment.

The book is written in everybody's language—not too technical, easy to understand and absorb; but without the use of too many technical and abstract words he has succeeded in conveying the completest technical exposition of sound projection yet written.

Mr. Miehling's book will become the standard reference book for serious projectionists who wish to educate and advance themselves as rapidly as possible.

A complete announcement as to price, etc., will be made soon. Prepare yourself to obtain a copy of this valuable book. No projectionist's understanding of his work will be complete without Mr. Miehling's careful and painstaking description of the entire field of sound projection.

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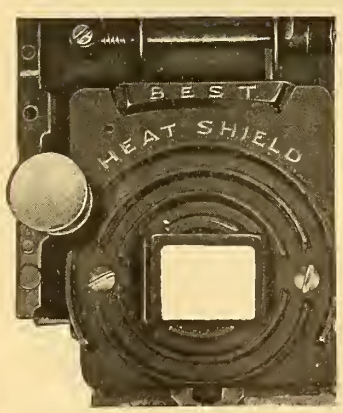
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1500 Wired U. S. Houses; W. E. Systems Predominate

About 1,500 theatres in the United States have been wired for sound pictures, with Western Electric having made 1,206 of these up to the end of January last.

Western Electric now has more than 150 houses in work, and this number is expected to be materially increased with the approach of the summer months. Western is far and away in the lead in the matter of sound installations, the so-called independent companies apparently having failed to make any appreciable dent in Western's business.

Conservative estimates place the number of wired houses at the end of 1929 at 3,000, with the independent sound companies planning to get a substantial number of contracts out of the new business. Western is understood to be confident of holding on to the bulk of the business, with RCA, which will be "set" soon to make installations all along the line, figured as the only serious competition.

This Matter of Proper Volume Control

(*Continued from page* 11)

might be re-orchestrated, but the productions have to appear on schedule, and some of the producers are willing to send the stuff out as long as they think there is a chance that the audiences will not get up, throw the chairs at the screen and lynch the house manager.

Audience Reactions

Another difficulty, for which the producers cannot be held responsible, lies in the uncertainty of audience reactions. In one instance which I witnessed the victim was the illustrious Martinelli, singing *Va Prononcer Ma Mort,* from *La Juive,* one of Vitaphone's operatic shorts. The tenor appeared in street clothes on the screen after being divested of his costume and Hittite nose. A small audience on a warm Sunday afternoon applauded only moderately and when the shade of Martinelli implacably offered two or three bows and synchronized smirks after they were silent, naturally they laughed. In this case the projectionist was caught flat-footed. He should have doused the grateful artist as soon as the audience indicated that it could bear to let him go back to the rewinder. Two few bows are always better than too many.

A much harder problem is encountered in connection with loud laughter from audiences during comedies. In a stage comedy when the audience laughs loud enough to drown out the succeeding dialogue the actors pause and wait for the roars to die down. In vaudeville they can laugh with the audience. But in the talking movies how is the director to know. when the action is recorded, what the audiences are going to do? His spacing is a matter of guesswork. He can, of course, have an audience present and try it on them, but, as every actor knows, different audiences do different things.

Paramount Favors Film Method for Recordings

Sidney R. Kent, general manager for Paramount-Famous-Lasky, announced recently that he favored the sound-on-film method of recording over the disc method, and that in future all P-F-L pictures would be scored by the former.

Although he cited the surface noises and scratchings which are audible in disc recordings as his main objection to that method, Kent's decision is supposed to have been influenced by other than purely scientific reasons, for his statement set forth the convenience of handling of the sound film as the most important reason for the switch. Disc recordings, said Kent, involve too much bulky shipping, a large breakage item and the impairment of sound quality with every revolution of the table, not to mention the important factor of probable error in mixing the records in projection rooms.

While Kent's stand has strong support in the industry, there are many who insist that with all its inconvenience the disc system gives by far the best results, and that the sound-on-film method may be spotted at once by the metallic tone it imparts to sound.

To return to volume control, however—what is the remedy for some of these defects? My answer is no better than that of anybody else, but I will venture a few suggestions. One consists in disagreement with the dogma that volume control is all taken care of in recording and, after the initial gain setting is made in the projection room, the faders should be left alone. This is good theory, but it doesn't always work in the present state of the recording art.

Part of the trouble is that the recording engineers, especially when they are working with discs, always have to worry about the ground noise. Their tendency is to bring up the gain on low portions and to iron out the record to one level. When the changes are not too rapid this could be fixed in projection. A wider range in volume can be secured there without excessive background disturbance, since lowering the reproducing gain brings down the ground noise with the signal. And, in general, accurate control of volume in recording, particularly in rush production, awaits future developments in instruments and technique. In short, while the best answer would be to record so well that projection could take place without any change in gain, with the present technique of recording skillful gain adjustment in the theatre could do a lot of good.

The projectionist, clearly, cannot be relied on for this. For one thing, he has too many other things to do. Secondly, he is not listening in the house, but in a more or less noisy and uncomfortable projection room.

A Possible Solution

One solution is to use automatic, electrical, or mechanical means of some sort to vary the amplification in the theatre within certain limits. This adds to the complications, but it is a possible future development.

In the meantime the best answer may be a limited gain control manipulated from a point in the house by someone who has nothing else to watch. This man may be a theatre musician, whose judgment is likely to be good on such matters as proper volume of speech and music. He will operate a remote gain control permitting a latitude of say, 15 or 20 TU. The setting in the projection room will be such that the house gain control can be brought up to the maximum without causing overloading or any such difficulties. The operator of the house control will preview the film several times with the house manager or someone in authority. In this way he will be able to arrange a cue sheet, which can readily be memorized after the first few trials, enabling him to turn out a much smoother performance than under present conditions in most theatres.

For example, if there is an abrupt change in selections he will at least be able to fade down to low volume during the shift. He will be able to drop an appropriate number of units for dialogue, bring up the gain once more for heavy musical accompaniments, tone down pianissimos which have been recorded with too much amplitude. and in general graduate the performance. I suspect that such a man, judiciously chosen, would more than earn his salary, and that his presence would help, in some measure, to preserve the life of the goose which is laying the golden eggs.

Two New Improvements for the booth

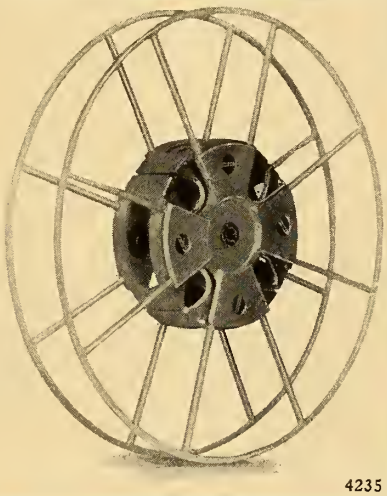
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

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THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

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Among the Local Unions

Local 650—Westchester, N. Y.

NEXT month marks the second anniversay of Local 650, whose record of progress since it was chartered has been unmatched in the annals of the Alliance. The membership naturally credits the officers of the Local for this advancement, not one change having been made in the personnel of the official family since we were organized.

Several incidents stand out in the record of Local 650 during the past two years, the most important being when Brother Sam Kaplan, President of Local 306, administered the oath to us in the City of Mt. Vernon on March 11th, 1927. We have lost two brothers by death in the last two years—Brothers George Engler and Alfred Duncan.

A strike that lasted for only a few days was the only jarring note in the functioning of the Local, but a settlement of this difficulty was rapid and satisfactory. Sound pictures next came along, and Local 650 kept in step with its development. Not the least important event was the establishment of THE MOTION PICTURE PROJECTIONIST, a step which had the enthusiastic endorsement and support of this Local from the word "Go," and an accomplishment of which every Local in the Alliance should be proud.

Finally, Local 650 acquired new quarters, which include a fine clubhouse; and now the picture is complete. Local 650 takes this opportunity to thank its many friends in the craft who have extended their active and moral support.

—F. W. MCLAIN.

Local 496—South Bend, Ind.

MAKING whoopee being so popular these days, Local 496 decided to make a little boom! boom! on its own account, to the enjoyment of its members and the apparent healthy effect on the Local treasury. Why and how they did it is told by Secretary A. F. Reasor, an eyewitness of the event:

Local 496, having only 20 members decided to have a little social party and perhaps (?) raise some money for the old bank account. We made arrangements with the Palais Royale ballroom to rent it for a certain guaranteed amount, which included the band and other help, with the understanding that the split would be 50-50 on the gross receipts over and above expenses.

From the Chicago Stage Lighting Co. and the Chicago Cinema Co. we rented spotlights and other effects to make the party a real one. Other expenditures were for noisemakers, paper hats and the usual items. Tickets sold for $1.00 a couple; and although it rained all day (it would!) and froze so that by night the streets were covered with ice, we had a big crowd.

The party started at 9 P. M. and was going strong at 2 A. M. The R. K. O. circuit, through the local Palace Theatre furnished a number of acts; one of the merchants gave a diamond ring for award to the lady holding the lucky number, and everybody gave us good support.

The party was a big success and the profits ditto. A little added feature was the taking of motion pictures of the affair which were shown in one of the local theatres.

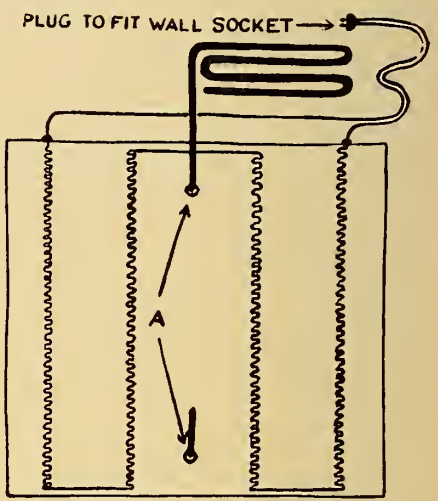
Local 360—Edmonton, Can.

F. BROADBENT, Secretary of Local 360, Edmonton, Alberta, Canada, wrote us recently that his long silence was occasioned by the severe cold weather experienced up in his section of the continent. It seems that 40° below zero is the usual thing up in Edmonton, and the natives never begin to worry much about the cold until the thermometer gets down around 60°, according to Mr. Broadbent.

In any case, it makes a good excuse for tardiness in executing certain commissions intrusted to Secretary Broadbent, and we hope that we shall not be deluged with claims for "coldest weather" honors from such places as Helena, Montana, and other such places which invariably make the front pages of the newspapers by virtue of their frigid climes.

Secretary Broadbent's delinquency must be excused, for it served to recall the little "efficiency stunt" sent in by him back in 1927, was printed in the November, 1927, issue and is worthy of reproduction herewith. This item will afford little of interest to projectionists in Florida, Louisiana, Georgia and other states in the Southern tier. Here is the "stunt" as set forth by Secretary Broadbent:

Here is a stunt they use in the Empress Theatre here. The projection room is so cold in the morning that the oil gets quite stiff and the projectors take some time to come up to normal speed. So Brother McLean (likewise from the Eskimo region) got a heating element and put two holes through the porcelain base (as shown at A in the accompanying sketch) and passed a heavy wire through them leaving a length at the top. This he bent at right angles to the heater and formed a loop or



slot to fit over and under the Top Plate No. P207D on his Simplex.

In the morning he opens the left door No. D11 of the projector he is starting with and hangs the heating element up so that it is facing the intermittent movement case and almost touching the flywheel. Then he plugs the heater in circuit and leaves it for about five minutes in which time the projector moving parts are all warmed up.

While projector No. 1 is running the same operation is repeated to warm up No. 2.



Officers of Local 650. Front row (sitting): Irving Weiss, Vice-Pres.; James J. Shaughnessy, Pres.; Arthur Martins, B. A. Back row: Richard Edwards, Treas.; Fred Thome, Fin.-Sec.; George Alley, Trustee; Tony Guido, Trustees Chairman; Wm. Dillberger, Seg't at Arms, and Ira Pye, Recording Sec'y.

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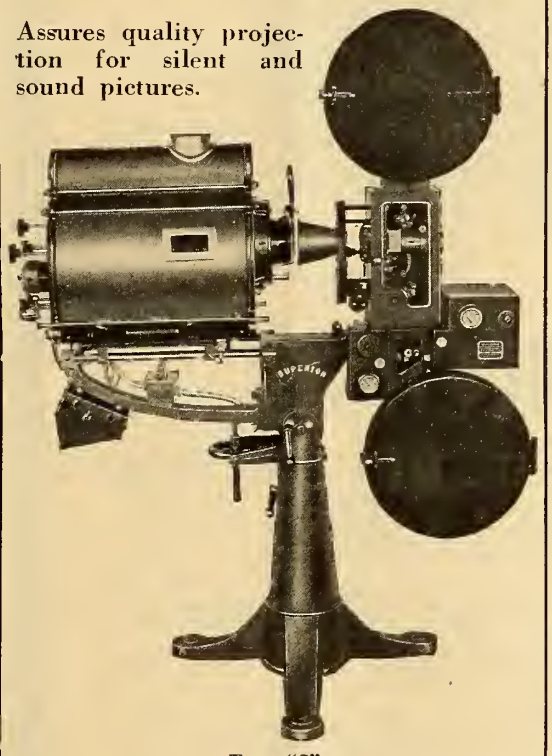
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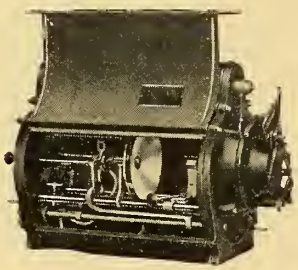
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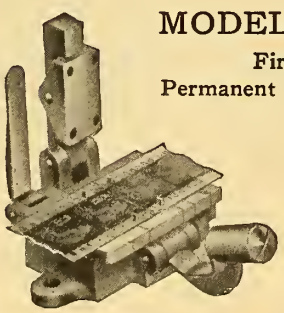
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Practical Data on Public Address Amplification

(*Continued from page* 9)

outputs with considerable care and thought.

In general, one 171 is usually adequate for home entertainment; two 171's in push-pull are more than ample (not, however, at the operating voltages encountered in most commercial radio receivers). The next most logical step is, not to the older 210 tubes, but to the new 250. One 250 is more than ample for the homes of even "volume hounds," and, in the experience of several large manufacturers of theatrical phonographs, is adequate for up to 2,000-seat houses (or for outdoor crowds of up to 10,000 people). Two 250's in push-pull stages in parallel, will handle the largest theatre or stadium ordinarily encountered, with ample reserve capacity.

Voltage Gain

Having determined the type of power output tube needed to develop the power required for any given installation, the amplification to precede the power tube which will be necessary can be determined. To drive a 171 tube to its maximum capacity of 700 milliwatts, an r.m.s. signal voltage applied to the grid of about 28 volts (40 volts peak) is needed; a push-pull 171 stage will need about 35 volts per tube to develop 2 watts. A single 250 tube will require about 60 volts r.m.s. to turn out 4.6 watts; a push-pull 250 stage about 79 volts per tube to turn out about 15 watts.

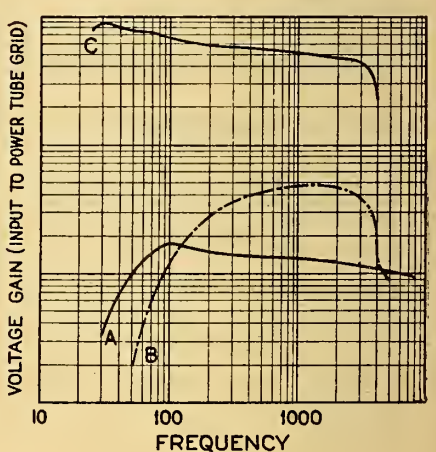


FIG. 5

Gain-frequency curves of the amplifiers illustrated. Curve A is for the amplifier of Fig. 1, B for that of Fig. 2 and C for that of Fig. 3-A-B.

Looking at the input apparatus, it is safe to assume that an average radio set detector tube will turn out an audio signal voltage of about .3 volt without serious distortion. The average commercial magnetic record pick-up will develop about 1.0 volt. Good double-button microphones can develop about .05 volt though in ordinary use their output may fall quite low. By dividing the power tube grid voltage of the radio detector, record pickup or microphone, the voltage gain needed between input and power tube can be found

Vitaphone Insists on Quality Reproduction

The Vitaphone Corp. announced early this month its position with regard to the use of its product (Vitaphone pictures), with other than its own reproducing system. The statement was practically the same as that issued several weeks ago by Western Electric in which was set forth the intention of that company to insist that its licensees' product have the benefit of a good quality reproducing system before the pictures would be released for exhibition.

After stressing the vast amount of work which has gone into the development of the Vitaphone system to its present efficiency, the statement continues: "Inadequate reproduction of Vitaphone product by means of inferior equipment, while it might yield temporary gain to exhibitors and to The Vitaphone Corp., would in the long run be damaging to the individual exhibitors and to the industry.

Insist on ERPI Quality

"The Vitaphone Corp., therefore, will require reproduction of its product by means of equipment which operates properly, reliably and efficiently to reproduce the same with adequate volume and quality to that obtained by the use of the equipment supplied by Electrical Research Products, Inc.

"Where such satisfactory equipment is installed, The Vitaphone Corp. will enter into negotiations with the exhibitor for its product."

And Now Chairs

And the Heywood-Wakefield Seating Co. of Boston, Mass., through its publicity representative, now comes to the fore with a statement that noises caused by the use of wood in theatre chairs necessitates their replacement with full upholstered seats. In short, the difficulty in putting over sound pictures is everywhere but in the production and reproduction ends.



A scene from "Our Dancing Daughters" starring Joan Crawford— a Metro-Goldwyn-Mayer picture

SHOOTING "IT" ON THE SCREEN

NATIONAL Projector Carbons get your star's personality "over" on the screen. They are so supremely successful as light producers that your audience is never aware of any mechanism between himself and his film favorite. National Projector Carbons are as free from faults as a Movie Hero . . . as bright as a Gagman's latest. They afford the projectionist freedom in the exercise of his skill. National Projector Carbons have everlasting dependable quality—they stay good friends with the projectionist by safeguarding his reputation.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide UCC *and Carbon Corporation*

Branch Sales Offices: Jersey City, N. J.; Pittsburgh, Pa.; Chicago, Ill.; San Francisco, Calif.; Birmingham, Ala.

approximately. The following table summarizes the results in practical form:

From the above table, it is possible to design an input amplifier which, placed between a given input device, will operate any specified power output stage to capacity. This can be most simply done if really good coupling transformers of known and dependable characteristics are available, by assuming the gain of any combination of tubes (excluding the power tube) and transformers to be the product of u and effective transformation ratios respectively.

Representative Amplifiers

In Figs. 1. 2, 3-A and 3-B are illustrated several amplifiers of varying coverage capacity and service. The foregoing data can be given practical meaning by consideration of these units and their characteristics.

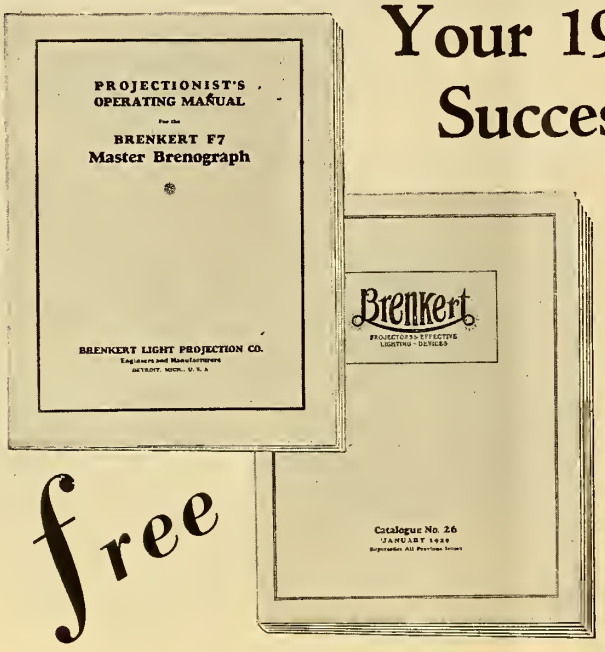
In Fig. 1 is a socket-powered two stage amplifier for radio or record input, which is intended to operate with one dynamic speaker having a 110 volt D. C. field (the field obtains current through its use as a choke in the filter circuit.) It will operate two dynamic speakers having external field excitation upon the addition of a choke coil outside its case. This amplifier is most interesting as it is the commercial equivalent of the units furnished to several makers of theatrical phonographs catering to theatres of 1,000 to 2,000 seats with great success.

The unit consists of a power supply incorporating one 281 rectifier tube supplying "A" and "C" power to one 226 and one 250 tube, and a maximum "B" voltage of 450 to the 250 tube when an external plate choke is used. In this amplifier one 4.3:1 input transformer, one 226 tube, and one 3.5:1 second stage transformer give a gain of about 120. Reference to the table shows more than adequate gain for record amplification, but insufficient gain to operate the 250 tube to full capacity from a radio detector tube without overloading. (The remedy is to use a highly grid-biased detector with a high plate voltage, capable of turning out several volts without serious distortion). This amplifier is not suited to microphone operation.

In Fig. 2 is illustrated an amplifier primarily designed for portable voice work,

(*Continued on page 33*)

Brenkert's Contribution to Your 1929 Success



Free

A Complete Operating Manual for Effect Lighting in All Theatres

To the thousands of theatres who have successfully used Brenkert effect devices in the past; to the theatres who have never used Brenkert effects; to all of those theatres who, at some time, hope to make use of the hundreds of mystical, colorful atmospheric changes which can be so easily obtained, Brenkert now has ready for distribution a complete operating manual on the famous Brenkert F-7 Master Brenograph which contains explicit instructions for obtaining all of those wonderful lighting effects so necessary to a well balanced motion picture program.

Fifteen large pages of interesting and highly useful information, profusely illustrated, and handsomely bound, make this booklet an indispensable part of the library of any theatre manager or projectionist.

A New Brenkert Catalog

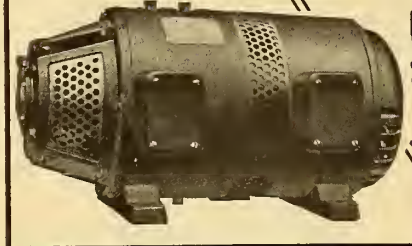
A NEW 1929 edition of the Brenkert catalog is also available for the asking. In this catalog are described and illustrated the complete line of those famous Brenkert projection devices which have come to be looked upon as the standard in leading theatres throughout the world. Spotlamps, effect projectors, special color projectors, and major equipments for the projection room are shown in detail.

Copies of Both—Now Free on Request

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St. Aubin at East Grand Boulevard., Detroit, Michigan

THE SAMUELS



STABILARC

is the only Motor Generator which requires no compensator or resistance starter. This means

A SAVING UP TO 20% IN FIRST COST

AUTOMATIC DEVICES CO., 735 Hamilton Street, Allentown, Pa.

Fundamentals of Projection Room Planning

(*Continued from page* 15)

the height of these ports, in the same manner that the angle determines the height of the lens ports. However, care must be taken in laying out ports which must necessarily be as large as a spot light or dissolver port, not to have them so high that the ceiling will interfere with the successful operation of the port shutters.

At this point in the construction of the drawing the supply dealer should confer with the electrical contractors, relative to the correct electrical equipment and the placing of same in the projection room.

The following should then be incorporated into the drawing: Correct size and location of all conduit for projectors, spot, and dissolvers, motor leads, trouble outlets, projection room outlets, instrument panels, etc.

The motor generator starter, switches, and instrument panels are then located on the projection room plan, together with the A. C. service and D. C. service panel.

This practically completes the projection room plan drawing providing of course, there are no radical changes in the iron construction of the theatre after this drawing has been finished. That, of course, may necessitate a complete revision of the projection room plan. Then a drawing should be made showing every necessary wire with its size and approximate location. This, of course, is subject to the approval of the National Board of Fire Underwriters and local and electrical inspectors.

National and Local Laws

In dealing with safety councils, local fire insurance boards and commissioners it is quite necessary to have practical knowledge of projection, installation and planning but in addition it is just as essential to exercise proper patience and diplomacy. Confidence in old and arbitrary regulations is not easily lost but friendly discussion and mutual understanding will almost invariably straighten matters out.

To illustrate how such situations can be handled the writer will describe an incident that occurred recently in a large Southern city. The fire commissioner absolutely forbade the use of spot and stereo ports unless they were cut down to 12-inch square. He also insisted that the projection room should be provided with openings covered with wire located in all four walls close to the floor. Permission was requested to see a copy of the local code and to our surprise we found that it was his purpose to compel us to adhere to specifications laid down for asbestos "booths" of twenty years ago.

The theatre in question was a large and modern one being built for a great circuit with a well organized construction and projection department. We were able to point out to him that the theatres in his own city were violating the code and that our precautions were quite a little in advance of those laid down for the asbestos

booth. The fire commissioner proved quite open-minded and it was a satisfaction to us to have him state that thereafter our requirements would be adopted as standard for his locality.

This incident indicates to what extent local authorities may be in error and how practical experience combined with good judgment may be used to correct mistakes.

Another diagram must be made to show the actual connection of every wire, switch, fuse and every piece of projection room equipment as well as the panel. Two other wiring diagrams should then be furnished showing complete electrical connection of speed indicators, voltmeters, ammeters and any other instrument which may be used in the projection room. The architect, construction engineers, builder and supervising projectionist of the circuit should then be supplied with blue print drawings of these five drawings. After a conference with these, if there are no changes to be made, the plans are ready to be taken to the theatre under construction.

Several weeks prior to the opening of the theatre, one of the engineers visits it and together with the projectionist, building constructor, and electrical engineers, make a complete check-up of the work as far as it has progressed. From this time on, a constant check should be kept on the theatre until it is time to install the projection equipment.

Installation Hints

The distributor's representatives then proceed with the actual installation of the equipment. After this in conjunction with the projectionist has been completed, test and retest every piece of apparatus, run in the projectors, calibrate the instruments, focus the lens, and set the screen until the theatre actually opens its doors for the first performance.

One or more of the engineers should then remain in the projection room until the closing of the theatre on its premier night.

The foregoing is an excellent method of planning and designing a projection room where a circuit or theatre is not capable of having a competent projection engineer on its staff. Of course, where there is such a man, it would be the duty of the chief projectionist and his staff to supervise the designing and the layout of the projection room completely from the very date of the filing of the plans with the building department.

Advisory Council's Purpose

It is not the purpose of the Projection Advisory Council to set itself up as an authority on all matters pertaining to projection. While it is true that within its large, varied and national membership will be found many of the best known projectionists in this country, no attempt will be made to arbitrarily define or establish standards.

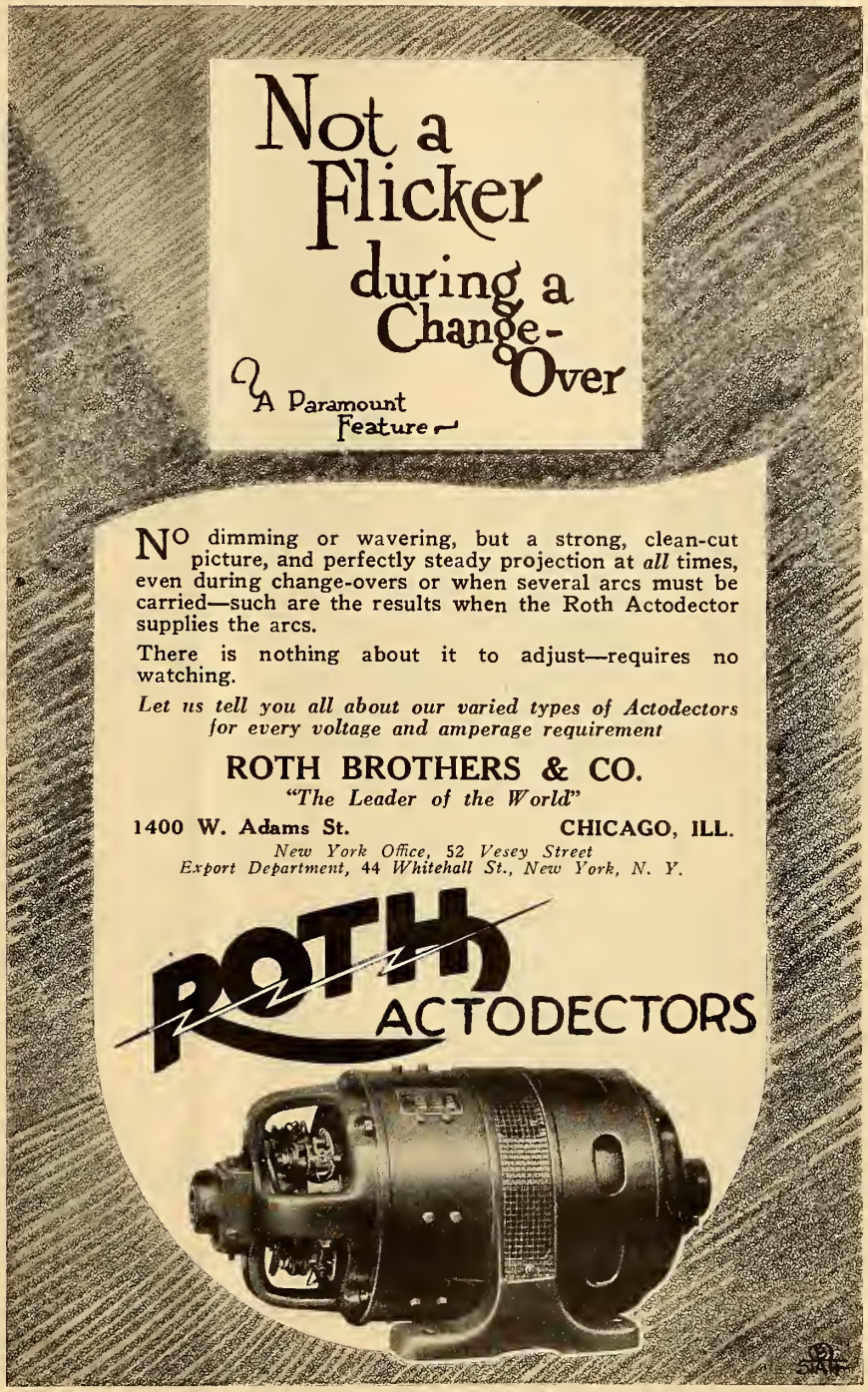
Individual opinion and experience, special requirements and conditions play a large part in making decisions. But it is certainly proper to gain more information about good projection practise. To exchange ideas and utilize valuable experience of others is unquestionably the right thing for all of us.

Owing to the constantly recurring changes in the show business, additional equipment may be required in a year or two after the theatre opens. Change of policy or ownership may necessitate the installation of additional projectors, spots, floods, etc. If the projection room is not large enough, or the distribution panel will not accommodate the additional equipment, alterations will be found quite expensive. The errors must be paid for by someone as the large circuits have found when taking over theatres from their former owners.

True Economy

Extra space, additional wiring, correct planning, allowance for change and expansion cost little when the house is being erected as compared with the expense and delay after the theatre is completed. Much time and expense would have been saved had we been able to anticipate the changes required by the installation of new projectors, spacing, battery rooms, etc., for sound installation.

Several years ago with the introduction of de luxe or stage presentations policy it was found necessary to install additional projection room equipment with its attendant wiring. The changes required were costly and in several instances exceeded original projection room construction costs. It is not to be supposed that all possible changes can be anticipated but reasonable construction and foresight at the time the theatre is constructed are certainly advisable.



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Varied and Effective Curtain Movements, in Harmony with Sound and Scene—when you employ

Vallen Noiseless All-Steel Safety Track.
Vallen Syncontrol for "Talkies."
Vallen High Speed Control for Front Drapes.

Your insurance against hitch or mis-cue.

VALLEN ELECTRICAL COMPANY, Inc.

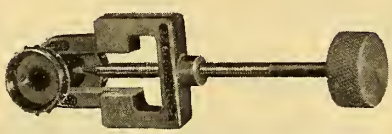
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THE STANDARD

New Intermittent Sprocket and Pin Press



Patented November 16, 1926

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CAN BE USED ON ALL PROJECTORS.....PRICE $8.50

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PROJECTION IMPROVEMENT CO.

DRIFTON, PA.

Cinema Philology

CARL DREHER, RCA Photophone vice-president, writing in a recent issue of *Radio Broadcast,* observed that the motion picture business was particularly adept in the matter of picking titles for various equipments which mean the same thing. Mr. Dreher expressed himself as follows:

"Dr. De Forest, who got off the famous sneer about Graeco-Schenectady designations when the terms 'plitron' and 'kenotron' were first offered to the world, should have something to say about the present crop of names for sound devices in the movies. Leaving out the past nomenclature, in which the mortality is rather heavy as the promotors go back to playing the horses, the following synthetics were discovered in a cursory search of two moving picture trade papers:

"Phototone, Orchestraphone, Orchestrola, Duotone, Electrograph, Duplex-o-phone, Dramaphone, Cortellaphone, Bristolphone, Sonoratone, Phonofilm, RCA Photophone, Movietone, Vitaphone, Vocafilm, Synchraphone, Theatrephone, Moviephone, Tonefilm, Biophone, Cinephone.

Not Including the Scandanavian

"This leaves out the foreign legion as well as a considerable number of American devices which were not advertising in those issues. A few are big, synchronized outfits, but most of them are theatre photographs intended for use in the smaller houses as an unsynchronized accompaniment to the pictures—simply a twin turntables, switches, a volume control, amplifier, and a cone loud speaker or two.

"After extended calculations, in which I consulted the works of Poincaré. Bertrand Russell, Lobatchevski, and Weierstrass, I find that 1.363×10^{18} possible combinations of *phone, tone,* and *film* with various other words in the English language remain on tap, so that no alarm need be felt by those interested in the continuance of this educational activity."

It would seem that Mr. Dreher's references were rather hastily selected and somewhat incomplete, and the following omissions are hereby gratuitously offered to complete the record:

Madaltone, Projecto-Phone, Kue-graph, Dulcetone, Hannaphone, Monroephone, Truetone, Kinetone and Motophone. Not that it is at all important, but simply to soothe the ruffled feathers of those stalwarts who were neglected.

Give This to Your Friend—Have Him Fill It in and Mail to us at Once

The Motion Picture Projectionist
45 West 45th Street, New York City
Gentlemen:

Enclosed please find $1.50 for which you will enter my subscription to your paper for one year (12 issues) starting with ..... issue.

I was recommended to your paper by
Name .....
Local No. .....

Name .....
Street .....
City .....
I am a member of Local No. .....

Universal Warns Managers on Volume Control

UNIVERSAL Pictures Corp., through its director of publicity and advertising, has sent out a warning to all its house managers anent the proper regulation of volume of sound pictures. This statement is interesting in that it presents the attitude of a large chain-theatre owner with regard to the division of responsibilty for best results with sound pictures in the theatre. The statement, in part, follows:

"There have been quite a number of complaints against sound pictures by patrons who claim they get headaches when seeing one," Weil points out. "There have been other complaints that the talkies are not perfected—voices all sound the same—there are too many 'surface noises,' etc.

Manager's Responsibility

"Most of this fault-finding is justified. The trouble, however, in 90 per cent of the casts is not with the pictures themselves; nor is it with the equipment and reproduction. The real trouble can be laid to lack of proper supervision of the sound reproduction by the manager of the theatre.

"While the operator in the booth is responsible for the running of the picture, we want the manager to be responsible for the volume at which the picture is run. We want the manager to make a check at least twice during every performance and, preferably, many more times than that, of the way his sound is filling the theatre.

"This is no place to go into detailed explanation as to the changes and further settings necessitated through the number of people in the audience. With an empty house you need less volume. With a packed house you need more. It is up to the manager to check the house and the volume and telephone the booth as to whether a picture is coming over too loud or too soft.

Too Much Volume

"The poor reproduction in most theatres that we have attended is due to an inclination to use too much volume. Human ears cannot stand the tremendous volume of sound being shot through the horns. The result is that the sound seems distorted, raspy and overpowering. Surface noises are amplified a millionfold. The dirt on the film or on the records almost becomes a blast through the horns. Headaches result. Complaints pour in.

"The remedy is to cut down on your volume so that the sound coming over will have a normal effect. You will find with lesser volume, in most cases, that all your troubles are done away with. Then music comes over sweetly—voices sound natural and each voice sounds different. Headaches and 'noise' complaints disappear.

"Managers are cautioned to keep an ear open on all shows and see that they get the best performance possible."

THE ENCYCLOPEDIA BRITTANICA OF MOTION PICTURE PROJECTION

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THE operator's happy because the manager is satisfied.

The manager is satisfied because the attendance is good.

The attendance is good because the public enjoys your picture.

So everybody's happy and the CINEPHOR plays an important part in their happiness by producing clearly defined, properly illuminated, contrasty pictures—pictures which are easy to look at—pictures which make the public want to come back for more.

Bausch & Lomb Optical Co.

650 St. Paul St. Rochester, N. Y.

Scenic Effects



RIVALING nature in their realism—Kliegl Scenic Effects give the touch of novelty to programs which pleases the American Public—used by leading exhibitors with feature pictures, special numbers, and orchestrations. The following are but a few of the hundreds of effects listed in our catalog:

Aurora Borealis
Flowing and Rippling Water
Moving Clouds and Rising Moon
Ocean Waves with Panorama
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THE BIOSCOPE PUBLISHING CO., Ltd.
8-10 Charing Cross Road, London, W. C. Eng.

Motion Picture Studio Lighting

(*Continued from page 7*)

ed to accommodate the incandescent lamp.

Lighting Classifications

Studio lighting may be divided into three parts, "soft," "hard" and "floodlighting." These terms are generally used to mean, first general or diffused lighting; second, local or directed lighting by means of projected beams or shafts of light; and third, a type of lighting between the two. "Floodlighting" is of special value where the light sources must be located at a considerable distance from the actors as with very large sets. The recommended lamps, fixtures and methods of using them are shown below.

given are recommended for f. 2. 3 lens speeds and Panchromatic film with camera speeds of sixteen pictures per second. With other lenses, types of film or cranking speeds these intensities do not apply. For instance, with Orthochromatic film the intensities must be doubled. On the other hand, faster lenses permit a reduction in brightness while, of course, slower lenses require brighter illumination to produce satisfactory pictures. In practice, for best results, the set will generally be lighted considerably brighter than the minimum values recommended here.

Suitable fixtures embodying the results of experiments with various types of equipment are now available from several recognized manufacturers. Inquiries on studio lighting applications and Mazda lamp performance may be addressed to the Commercial Engineering Department of the Westinghouse Lamp Company, Bloomfield, N. J.

"SOFT" LIGHTING

Lamps	*Fixtures*	*Operation*
Lamps designed for General Lighting Service. 1000 } 1500 } Watt PS52 2500 }	1. RLM Reflectors. 2. Westinghouse High Bay Units. 3. Westinghouse Floodlights or Airport Projectors with or without housings. 4. Special.	Burn lamps at over voltage during exposure. For instance, use 105 volt lamps on 115 volt circuits. These lamps may be operated in any position. Minimum intensity on vertical surfaces 100 ft. candles.

"HARD" LIGHTING

A. Back Lighting Lamps designed for Spotlight Service. 1000 } 1500 } Watt G40 2000 Watt G48	1. Theatrical Spotlights. 2. Projector Reflectors. 3. Special beam producing devices.	Burn lamps at label volts during exposure. See next page for burning position. Intensity of illumination several times that of "Soft" lighting.
B. High-Lights and Sunlight	*Effects*	
2000 Watt G40 — Spotlight 5000 Watt G64 — Projection 10,000 Watt G80 — Projection	1. Theatrical Spotlights. 2. Projector Reflectors. 3. Special beam producing devices.	Burn lamps at label volts during exposure. See next page for burning position. Intensity of illumination several times that of "Soft" lighting.

"FLOODLIGHTING"

5000 Watt G64 — Projection 10,000 Watt G80 — Projection	Parabolic reflectors or special devices to direct light into an even beam of approximately 30 degrees divergence.	Burn lamps at label volts during exposure. See next page for burning position. Minimum intensity on vertical surfaces, 100 ft. candles.

Spotlight lamps may be operated in any position except within 45° of base vertically up. The projection lamps listed are designed to operate vertically in the base down position but may be titled 45° without materially affecting their performance.

The minimum intensities of illumination

Lauste Developing New Type Reproducer

EUGENE A. LAUSTE, pioneer worker in the field of sound-on-film, will shortly disclose a new type of reproducing device, which will transform electrical impulses into sound waves without the use of a sensitized diaphragm or other mechanical means. According to an announcement made at the Bloomfield (N. J.) laboratory of the veteran inventor, the new amplifying system is the result of research and experiments begun more than fifteen years ago, when he was perfecting his sound-on-film method, which is the basis of the systems in vogue today.

It is stated that the new Lauste reproducing system will furnish the solution of many amplification problems, by reason of the fact that it does away with the necessity of using a microphone or sensitized diaphragm in sound transmission. All distortion and impedance will thus be overcome and the sound effects reproduced will be absolutely natural and true in tonal quality.

Lauste Patents in 5th Edition

It is interesting to note that the demand for Mr. Lauste's original sound-on-film patent, described as "a new and improved method of and means for recording and reproducing movements and sounds" No. 18,057, British Patent Office, 1906. has become so great that the British patent officials have found it necessary to issue a *fifth* edition of the papers describing Mr. Lauste's invention. This is believed to be a record, inasmuch as very few patents ever reach even a third edition or printing. and indicates the wide interest in the broad claims allowed Mr. Lauste in his original amplification, all of which are now in the public domain.

When YOU equip for sound

A RELIABLE CHANGEOVER DEVICE

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Over 1500 installations of

STRONG ELECTRIC CHANGEOVERS

during the past year, show how this reliable device, is demanded by the best projectionists in the country.

You Need Them More Than Ever With Sound

Manufactured by

ESSANNAY ELECTRIC MFG. CO.

MAYWOOD, ILL.

Distributed by NATIONAL THEATRE SUPPLY CO.

Important Sound Operation Points

(*Continued from page* 18)

90 ft. per minute—that is to say, when running such pictures the motor control box regulating switch must *always* be set at "REG," as already mentioned in these instructions, and *never* at "VAR." Any adjustment in the timing of the program by speeding up numbers or slowing them down must therefore be done elsewhere than in the synchronized reels.

So that the projectionist may have immediate and proper notification in case any part of the show is not coming over as it should, a member of the staff designated by the management, perhaps an usher should remain in the theatre all through the performance. This observer should be competent to judge quality of reproduction, synchronism, etc.; he should be within reach of the observer's telephone and giving responsibility for notifying the projectionist immediately anything goes wrong. He should also keep the projectionist informed as to how well the house is filled, so that the latter can adjust the volume if necessary.

Never make the monitor horn so loud that it can be heard outside the projection room; keep the volume up just enough to follow the sound after the numbers have started, and make it a little louder before cues.

Use of Blank Leader

Do not cut synchronized film or sound film except in case of breakage. If it is found desirable to eliminate bows at the end of the film, use the douser. If there is insufficient leader to permit proper threading of the film at starting, you may add more blank leader, provided, of course, it is added *before* the "START" mark. Leader must always be so added if it is found that the voice or music begins before the motor is fully up to speed.

If the machines are equipped with a safety device which stops the motor when the film has run through, then, with disc, reproduction, in case the record does not end until some time after the finish of the film, this ending will be spoiled through the safety device shutting down the equipment, *unless* sufficient blank film is added at the end to keep this device from operating until the music is finished. Check this point during rehearsal and before running show make sure these blank lengths have been added to any reels that require them.

With subjects using disc reproduction a broken film is a more serious interruption than with ordinary subjects, on account of the need for synchronism between record and film, and with film reproduction, a break is also specially objectionable because it cuts off the music as well as the picture. Therefore, examine all synchronized films and sound films with extra care when rewinding, so as to catch tears before they develop into breaks. For this reason, rewind by hand and not by motor.

For short subjects, determine how soon after end of voice or music accompanying each subject the picture should be faded out. On second and following subjects, determine when motor of incoming machine should be started to allow proper time interval between subjects, and when fader should be brought up to its setting to catch incoming music.

Horn Settings

If using a safety device that stops motor when film has run through, see whether there are any reels where the film terminates before the end of the record is reached, and add blank film at end as required.

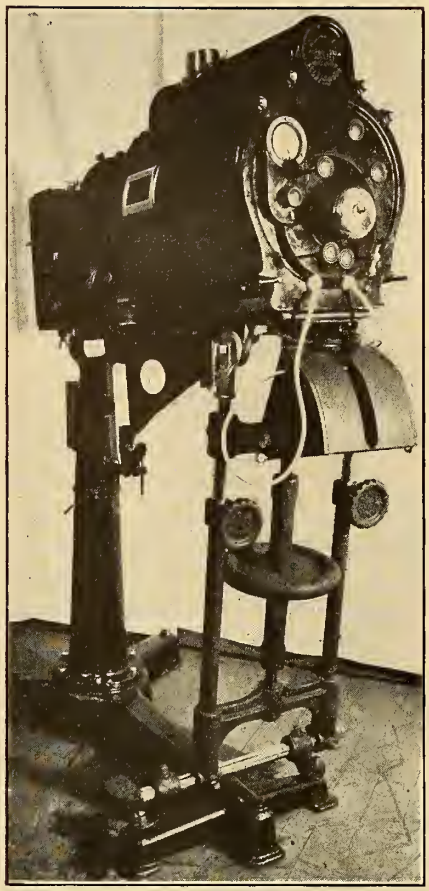
As previously mentioned, in houses where the upper horns are of the 12-A type and the lower horns of the 13-A type, and where an output control panel is used, with a separate control for each horn, three different types of combination or settings of the upper and lower horns are used, and designated respectively by the letters "A," "B," and "C."

The "A" setting is for vocal and instrumental solos or speech and uses upper horns only or upper horns with some lower horn.

The "B" setting adds more lower horn to bring out effect of orchestral accompaniment.

The "C" setting is for orchestra

(*Continued on next page*)



MESTRUM'S combination lamphouse carriage and pedestal brace for Simplex projectors insures perfect rigidity and eliminates all vibration. Can be used with old-style, 3-point base or with new-style, 5-point base, especially with Movietone and Vitaphone. Installed quickly without machine work.

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Super-Lite Lens

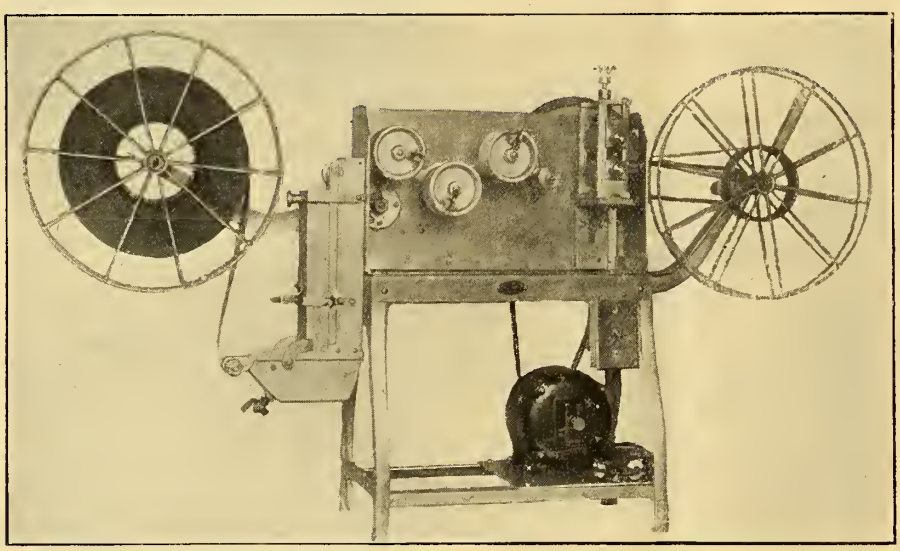


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Mr. Projectionist! Your manager and the public depend upon you! It is your responsibility to see that you have a clear and perfect picture on the screen. It is up to you to see that all causes of eyestrain, such as flickering, rainy and cloudy effects are eliminated!

Our new low-priced Cleaning Machine is especially adapted for theatres. The cost to operate it is about $2.00 a week, takes about five minutes' time to clean 1000 feet of film—and the result is the elimination of all the above mentioned defects. Insist on having one in your booth!

Write today for our illustrated booklet.

THE DWORSKY FILM MACHINE CORPORATION

61 SIXTH STREET, LONG ISLAND CITY, N. Y.

How Many New subscribers have you secured for THE MOTION PICTURE PROJECTIONIST? Introduce your friend to the craft's only paper. Take advantage of the present low subscription rate—$1.50 per year.

Do It Now!

alone and carries further result mentioned for the "B" setting.

Inasmuch as the settings are determined by careful tests of the house they should be followed without change. Other settings than recommended may throw system out of balance electrically and overload it or distort sound.

Observe Recommended Settings

As a matter of convenience, and in order to give the theatres the benefit of the opinion of the recording and engineering staffs, recommended fader and horn settings are frequently marked on records or films or given on cue sheets sent out with them. Our engineers so adjust the amplifiers that with a full house, and fader setting recommended, correct full house volume is obtained. With house only partially filled fader should be brought down one or two steps.

Determine horn settings and empty house fader settings for each number, bearing in mind any recommendations marked on or accompanying record or film. Do this with care and in particular do not permit too high a volume. Synchronized scores to feature pictures should be run at a volume appropriate to incidental music. Never make the volume so loud that it causes the needles to oscillate on the amplifier plate current meters. If this happens, it is a sure sign of overloading and poor quality.

Speakers talking at a distance or in conversational tones should be reproduced with less volume than those speaking close or obviously talking loudly. Instrumental solos should have less volume than full orchestras (not accompanying), bands, etc. In news reels, street noises, locomotive whistles, etc., should be loud to give correct illusion.

Proper Volume Control

In certain records effect may be improved by bringing the fader up or down a step at certain points in the picture, as just mentioned. Even the horn setting may occasionally be changed during a number as the record changes from light or vocal effects, which are best reproduced by upper horns, to heavier orchestral music for which lower horns are brought out.

However, discretion must be used in not making too great or too frequent changes in horn and fader settings; each record is made under skilled musical and technical direction in such a manner that when it is reproduced the effect desired by composer, artist, and conductor will be obtained without any need for frequently changing settings while playing. If they are changed too much, therefore, proper effect will not be obtained.

Having rehearsed show and determined all settings, curtain cues, etc. record them in the form of a cue card posted in the projection room.

In communicating with the projectionist by means of the telephone set, it will be found handy to use the buzzer, with the following code:—

One buzz—Fader up one.
Two buzzes—Fader down one.
Three buzzes—Answer telephone.

Where to Buy Good Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

VANCOUVER, CANADA

FOR live dependable service and attractive prices write.

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Complete Theatre Equipment Specialists

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SOUTHWEST Theatre Equipment Co., 321 North Main St., Wichita, Kansas. Jobbers and Distributors of Equipment. Get our prices on what you need. Address your inquiry, attention C. D. Peck, Manager, member I. A. T. S. E. No. 414.

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Public Address Amplification

(*Continued from page* 25)

and used with considerable success, not only by theatres, experimenters, etc., but by the U. S. Shipping Board for its exhibits at many state and county fairs. It is shown with a hand and broadcast microphone (single and double button respectively), and two morning glory projectors. Socket powered, it uses one each 227, 226, 250 tubes with two 281 rectifiers. For radio or record input, the gain, made up by three transformers and the 227 and 226 tubes, is about 2.5x8x2.5x8x2.5=1,000 (approximately).

For voice, the transformation ratio of the input transformer is about 18, so that the total gain is 18x8x2.5x8x2.5=7,200. In practise, these gain figures are halved by stabilizing resistances, for such high gain could not be maintained in practise in so compact a socket powered amplifier. The actual usable gain is higher, in any case, than the figures of 1,200, 60, and 200 times indicated in the table. The frequency curve of this amplifier indicated that while it is quite satisfactory for voice, it is not so good for music as is the unit of Fig. 1 Flexibility of service, however, is in its favor.

Public Address Amplifier

In Fig. 3-A and 3-B is illustrated an excellent example of a group address amplifier at its best. This system is made up of unit panels 21 inches long and 4 inches or 8 inches wide, bolted into a channel iron frame. It is socket powered, except only for microphone battery, and, being very flexible, can be developed to provide from 15 to 120 watts (or more if needed) of undistorted power output by adding output amplifier panels.

At the top is a vacuum tube voltmeter used as a visula volume level indicator. It has a calibration adjustment, and direct reading gain control (30 TU in 15 steps of 2 TU each). Below it is an input control panel allowing selection of one of two microphones, or radio or record input. Microphone current is adjustable and can be measured at jacks. A 15-step master gain control regulates volume in 2 TU steps which give just perceptible intensity changes. Below is a three-stage input amplifier using one each 227, 226 and 171-A tubes (two 226's in push-pull could replace the 171-A nicely). This amplifier has no adjustments except hum balances; three jacks permit measurement of plate current of the three tunes. Below it is a test meter panel carrying one 0-50 and one 0-200 milliammeter equipped with cords and plugs. Next down is an A-B-C power supply unit for the three stage input amplifier; and at the bottom are two identical push-pull output amplifiers each using two 250 and 281 tubes, with an undistorted power output capacity of 15 watts each, or 30 watts for both.

Black panels for additional push-pull channels or output control apparatus, are at the bottom of the rack. All panels and their dust covers, which fit over all apparatus attached to their year surfaces, are of heavy aluminum—necessary for quiet A. C. operation. The entire amplifier has a stable gain of about 5,000 for radio or record input and a frequency characteristic as in Fig. 5. Its 30 watts will operate ten dynamic projectors to cover, not one, but actually four to five 2,000 seat theatres or one very large theatre, hotel, auditorium, or stadium. If preferred, it will deliver 500 milliwatts to each of sixty speakers for hotel, apartment, or hospital reproduction at a good volume and with excellent quality.

Due to the difficulty of building an A. C. amplifier having a gain of 5,000 (or much more for microphone operation,) the makers do not furnish data for the assembly of amplifiers of this class.

In conclusion, it is not felt that it would serve a purpose worthy of the space involved to summarize the requirements and data set forth. For those interested in group or public address work, it would be preferable to re-read this article, to assimilate fully all data, or retain it for future reference, since it attempts to cover some of the simpler, but apparently troublesome, phases of such work.

Number and Type of Tubes In Output Stage	Undistorted Output, at Max. Voltages, In Watts →	R.M.S. Signal Voltage Needed at Grid of Power Tube	Voltage Gain Needed with Various Inputs		
			Mike (.05 V.)	Pickup (1.0 V.)	Radio Detector (.3 V.)
1–171	.7	28	569	28	93
2–171's in push-pull	2.1 (approx.)	35	700	35	117
1–250	4.6	60	1,200	60	200
2–250's in push-pull	15 (approx.)	79	1,580	79	260
4–250's in push-pull (2 stages in parallel)	30 (approx.)	79	1,580	79	260

NOTE: ALL FIGURES ARE FOR R. M. S. VOLTAGES.

Wire Slides Across U. S. Within 7 Minutes

STILL another use for the effect machine was demonstrated recently when J. E. Robin, engineer for the Brenkert Light Projection Co., arranged for the transmission of effect slides for use with the Brenograph, with the results shown in the accompanying illustrations.

So pleased were Brenkert officials with this test that they have arranged to use this service as a regular feature of their sales campaign for the F-7 master Brenograph.

The advantages of this service and its adaptability to the increasing demand in show business for speedy service were emphasized by Mr. Robin, who has been working out the details of the plan for several months now.

"By this plan," said Mr. Robin, "an effect shown in a New York theatre may be put on the A. T. & T. wires and be available for showing in Los Angeles not more than ten minutes later. Actual transmission requires only seven minutes, and theatres in towns remote from the A. T. & T. receiving station may be served similarly in from 4 to 8 hours, through the medium of aeroplane delivery which is a feature of A. T. & T. service.

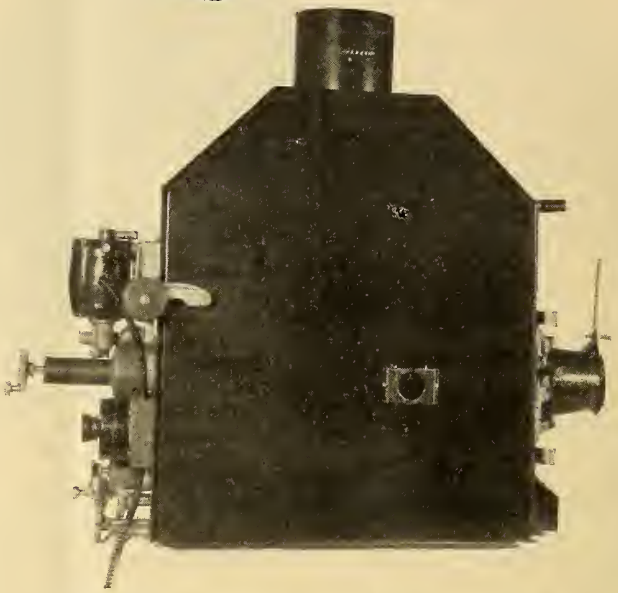
"It may be that conditions necessitating such speed service will arise, but it is reassuring to know that it is obtainable for the asking. Similarly, still pictures of an important event—such as the inauguration of a President in Washington—may be put on the wires and shown in the larger cities adjacent to a receiving station within ten minutes, and in the remotest village within 7 hours after the picture is taken.

"Such service naturally enables the progressive theatre to offer still another extension of its entertainment and pictorial news program, and the alert theatre owner will be quick to take advantage of anything that will help his business. Already we have received many inquiries on the service, and we shall soon be ready to out the plan into work on a large scale.

"This test further demonstrates the many new applications of equipment such as the Brenograph to the task of adding novelty to the theatre program. Just as projectionists have continually been widening the scope of novel work possible with the effect machine, this new service will open still another path of entertainment from the projection room to the screen."

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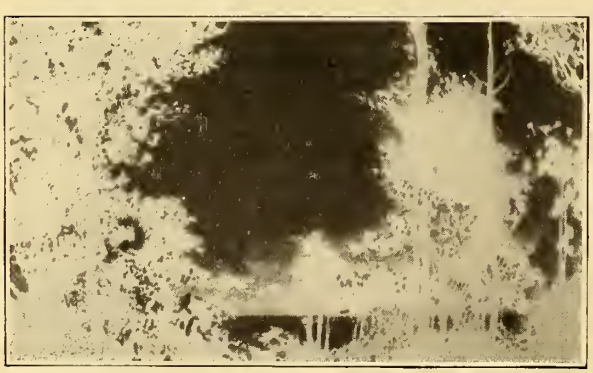
HALL & CONNOLLY, Inc.

24 VAN DAM STREET NEW YORK CITY

Western Small-House Apparatus

Orders for the new Western Electric sound projection equipment for small theatres are now being taken, with delivery promised after June 1. This equipment is priced at $5,500 for installation of either Vitaphone or Movietone, and at $7,500 for both systems.

Announcement of this small-theatre equipment, which is guaranteed to give as good tonal quality as the large apparatus does in large houses, is regarded as Western's answer to the report that the production of low-priced equipment would shortly begin at the Seymour Products Co.'s plant in Seymour, Conn. This company is a subsidiary of the Pacent Electric Co., sponsors of a reproducer.





Actual photos of slides received over the A. T. & T. wires, showing the fine detail of the effect which was not lost in the process. The dark portion of the effect on the right is the only apparent defect.

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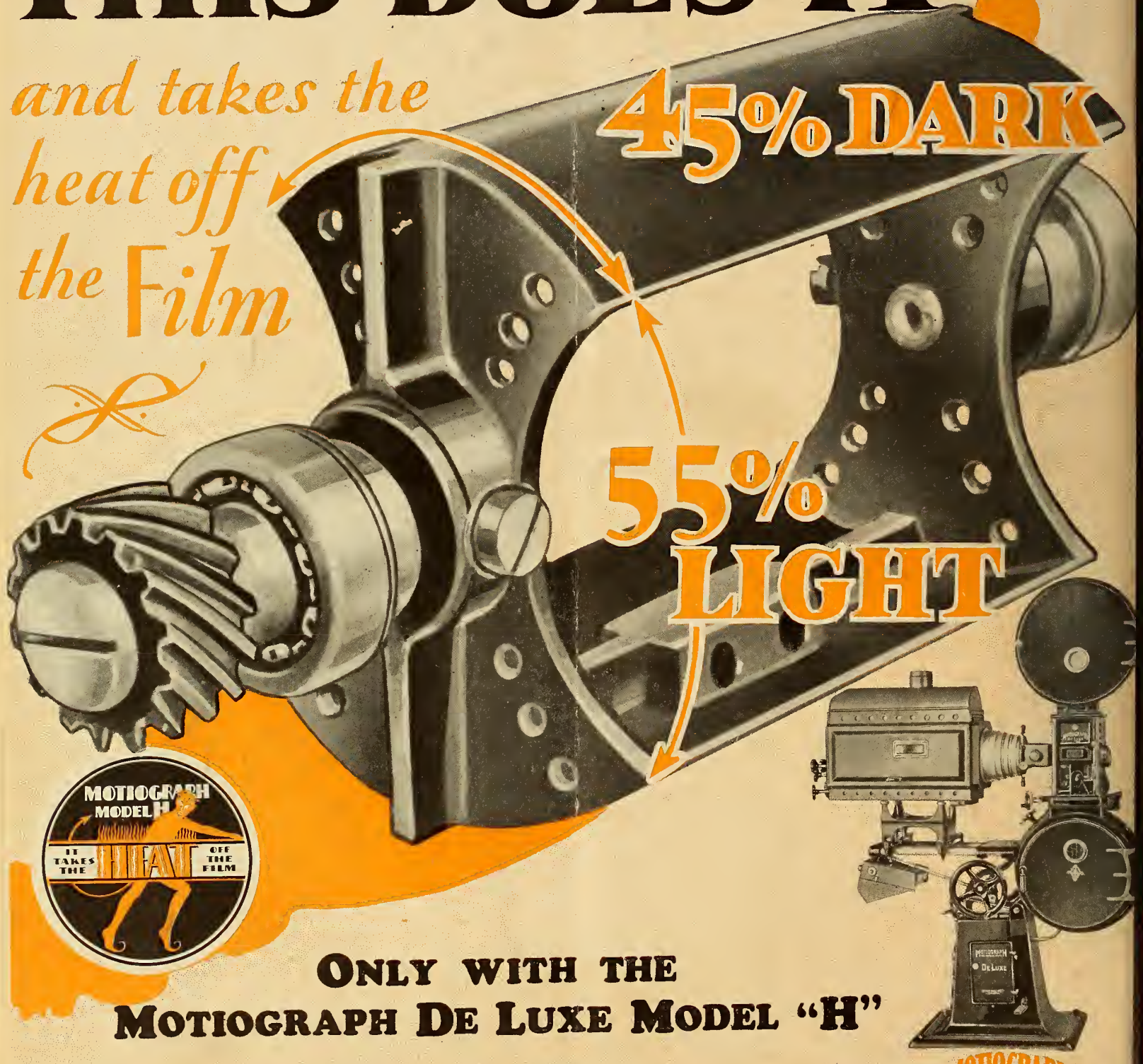
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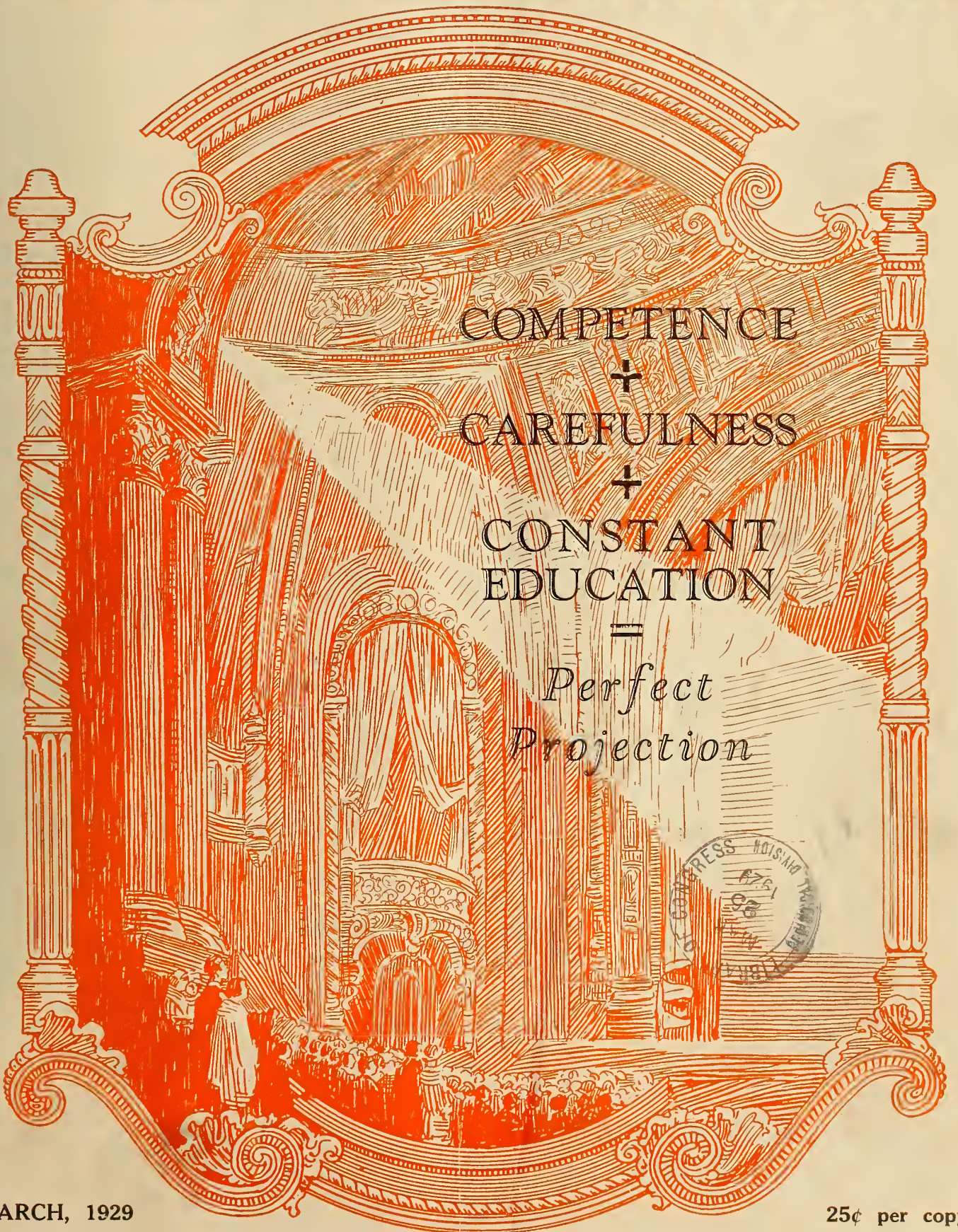
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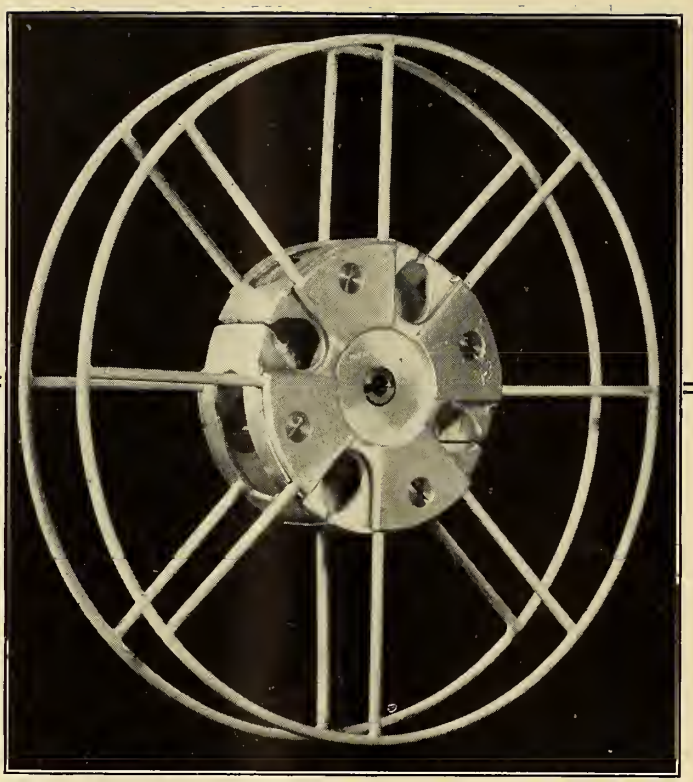
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729 Seventh Avenue **NEW YORK CITY**

New-type Speakers Seen

By R. P. CLARKSON*

ELECTRICITY is seldom visualized as being in the same class as a belt, a rope or a gear, and yet that is exactly what it is. Electricity isn't power any more than a belt is power. It is purely a means of transmitting power. One must generate power somewhere by falling water turning a wheel or by burning coal to change water into steam with which to operate an engine, or burning a hydrocarbon to run an internal combustion engine, or by some other manner. Electricity in any quantities, if indeed in even minute quantities, cannot be generated of itself. Then when one gets the power one can convert it from mechanical energy into electrical energy which flows along wires and can be changed back into mechanical energy for use somewhere by utilizing any quality of the electric energy.

Four Principles

These electric qualities are chemical change, heating, magnetism, static field. Our electric meters utilize these characteristics of electricity to measure the units of electricity which will produce them and which have produced them by purely experimental tests. We have the electrolytic instruments which measure the juice by its electrochemical deposit. We have the hot wire type, in which the heating effect of a current causes expansion of a wire and the measurement of the expansion tells you the amount of current. The Hoyt people made these instruments widespread.

On top of all these we have the electrostatic type of meters seldom used until recent years, but now in wide use in connection with radio. Here the static field, which becomes more apparent with high frequency and high voltage, or either, is utilized in a manner very similar to the magnetic field, except that plates are used instead of coils.

Application to Motors

Motors may be made utilizing any of these four principles. The most common motor is electromagnetic, just as is the most common meter. Electrostatic motors are built, however, and heat motors as well as chemical motors are possible. There is very little difference between a meter and a motor. A meter goes only part of a revolution and is stopped by spring action even though it tends to continue. A motor keeps right on going.

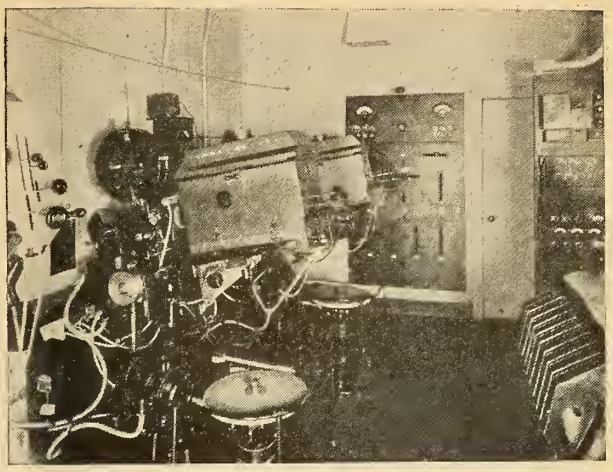
All of these lead us to speakers. Fundamentally, speakers, meters and motors are types of transformers. A head phone is always mathematically treated as a transformer in which the winding is considered the primary and the diaphragm as the secondary. It is even more commonly visualized as a motor in which the diaphragm is the moving armature. That it is a meter is shown from the fact that a cheap oscillograph can be made by mounting a sloping mirror on the diaphragm and thus a light beam is wiggled to correspond with diaphragm motion.

Most speakers utilize the magnetic principle, the attraction between coil and magnet, between two coils, or between two magnets. There are hot wire headphones, of course, the heating and cooling of a Wollaston wire in a small chamber sending out the sound waves. In all probability the chemical action of current could be made to produce vibrations in air and thus make sound.

For many years, static speakers and microphones have been known and used. Now we are told that a type of electrostatic speaker has been developed which is loud enough for commercial purposes. Thus the step taken in motors, meters and other devices will now be taken in radio speakers. In place of attraction and repulsion between coils we shall have similar action between plates.

The speaker will be a condenser, an electrostatic motor. The charge on one plate will affect the charge on another plate, and although the force is tiny the action can be stepped up by a constant charge, somewhat as the permanent magnet in a speaker is essential. Presumably, too, the plates will be similar to those in a condenser microphone where stretched nickel diaphragms are used.

*Courtesy R. P. Clarkson and *The N. Y. Sun.*



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THE MOTION PICTURE PROJECTIONIST

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Wires for Correcting Acoustics a Failure

CARL DREHER, writing in a recent issue of *Radio Broadcast,* makes the following interesting comments anent the efficacy, or, rather, the lack of it, of correcting the acoustics of an auditorium by stretching wires from wall to wall at various points of the hall:

"The lament is frequently raised that once an error is spread abroad it is impossible for the truth to catch up with it. This is a sad fact, even in engineering circles. Specialization adds to the confusion. The highly skilled technicians in some little corner of applied science can't be fooled when it comes to their own specialty, but they take more or less on hearsay material from other fields, and thus they learn many things which are not so.

A "Romantic Device"

"The fallacy about remedying defective acoustics in auditoriums by the use of stretched cords and wires is known to all acoustic engineers. Its absurdity was first exposed by Wallace Clement Sabine. It can be shown theoretically that the scheme cannot work, and practice bears out the theory. When it seems to work the usual reason is that a large audience has been crowded into the hall, and the resulting increase in acoustic absorption has partially remedied the trouble.

"To an acoustic engineer, or any university student in the physics of sound, or to broadcasters who know the elements of their business, all this is well known, but among other learned men the romantic device of stretching wires for acoustic correction still holds its own. I present in evidence an excerpt from the discussion on Prof. F. R. Watson's 'Acoustics of Motion Picture Theatres,' taken from the *Transactions of the Society of Motion Picture Engineers,* Vol. XI, No. 32, 1927, p. 650;

Mr. S.: You probably remember when the Century Theatre in New York was opened. The acoustics made it almost impossible to give a play, so they intermeshed the ceiling with fine wire and it made a great improvement.

Mr. R.: I know a case in Chicago where a plain wall building gave a bad echo. They stretched wires across the hall and kept adding them until they broke up the echo.

Mr. C.: I know the Denver Auditorium suffered that way and the cross wires corrected the effect, but of course, they are unsightly.

Mr. Watson (*communicated*): Wires in an auditorium are practically useless. If an auditorium with wires has good acoustics, this must be due to other features—carpet, upholstered seats, or other absorbents. The Denver Civic Auditorium, for example, had a considerable amount of absorbent installed."

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All changes of addresses must be reported at least two weeks in advance of the date on which they are to become effective. Both new and old addresses must be given.

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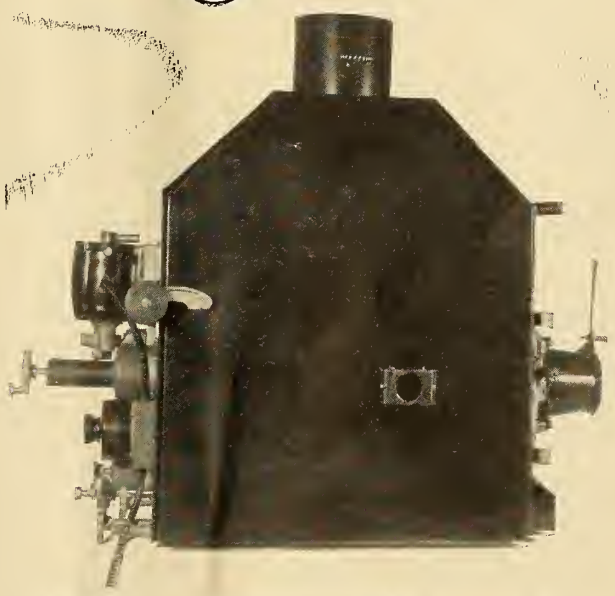


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INTERNATIONAL PROJECTOR CORPORATION
NEW YORK

The Motor Control Box

By FOX-CASE ENGINEERING STAFF

EVERYBODY who has attempted to develop a system for synchronizing sound with pictures has found, before long, that the recording and reproducing of the sound accompaniment, and its synchronization with the picture, were not the whole of the problem. A very important question, it was soon realized, was the driving of the mechanism at the correct speed. In this connection, three things are essential:

1. Not only must the sound be reproduced in synchronism with the picture—this can be done comparatively easily by driving both the projector and the reproducing mechanism with the same motor—but also the speed of the reproducing equipment must be exactly the same as the speed at which the picture was taken and recorded. The reason for this is that if a sound record is played at a faster or slower speed than it was recorded, there will be a distortion of the voice or music which makes it sound unnatural. This one can easily verify by a little experimenting with a record on a good phonograph, one where departures from high quality reproduction are readily noticeable. The standard film speed for all Western Electric disc and film recording and reproducing is 90 feet per minute, or 18 inches per second. The drive gearing used is such that this requires a motor speed of 1200 R.P.M.

2. Not only must the reproducing speed be the same at which the picture was taken and recorded, but this speed must be kept very steady indeed—it cannot be allowed to vary by more than a very slight percentage, despite all ordinary changes in load and in supply voltage. Otherwise fluctuations in pitch will be constantly noticed in the reproduced sound, causing the voice to seem shaky and the music out of tune. Here again, the effect referred to has at some time been noticed by nearly everyone, in listening to a phonograph which did not have a very good governor.

3. In addition to the foregoing requirements it is also necessary, of course, to be able to regulate the motor speed in the usual manner when silent pictures are being shown.

The function of the motor control box and special motor used with Western Electric reproducing equipment is to meet the three requirements just stated. Readers with some knowledge of electric motors may here ask why the constant speed requirements could not be made by using a compound wound motor on D.C. or a synchronous motor on A.C., as these are usually considered to be constant speed machines.

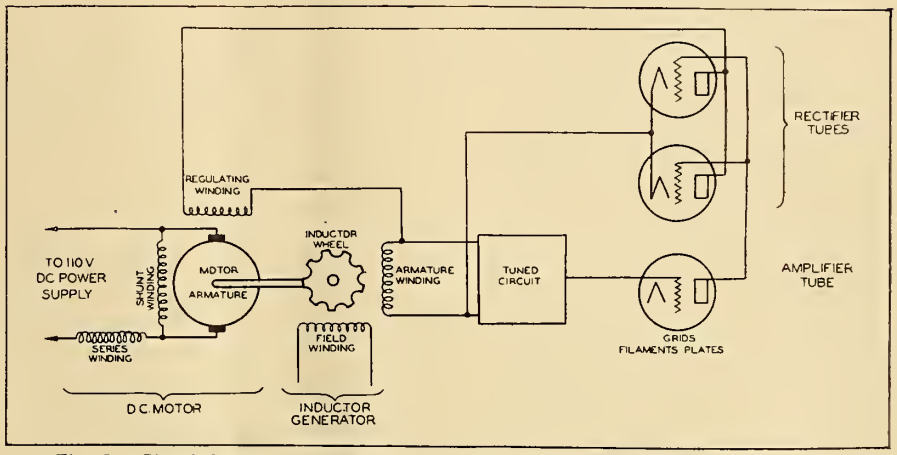


Fig. 1. Simplified diagram showing action of D. C. motor and control box

Demands of Load Fluctuations

With regard to the compound D.C. motor, the answer is that while for ordinary industrial purposes this is true, yet under common fluctuations of load and voltage, the speed regulation of such motors is not close enough to meet the very exact requirements of synchronized sound reproduction; and in the case of the synchronous A.C. motor there are the objections that it does not have a very good starting torque, and that speed regulation, such as is required for running silent pictures, could not be obtained. Evidently, therefore, the problem is one which requires new methods for its solution.

Before describing the operation of the motor control box it is necessary to explain one important special electrical feature on which its operation depends. This is what is called a "tuned" or "resonant" circuit.

By this is meant a circuit which will permit alternating current of a certain frequency to pass fairly readily, but which offers a high resistance to alternating currents of any other frequencies. The frequency which such a circuit is designed to pass is called the "tuned" or "resonant" or "critical" frequency.

Perhaps this phenomenon will appear less mysterious if it is stated that exactly the same thing happens in mechanical engineering and can be illustrated very simply. Take a piece of rubber band and, holding it by one end, hang on the other end some object heavy enough to stretch it moderately. The weight will bounce up and down at a regular rate and a touch will be enough to keep it going. But if one tries to move it faster or slower than this natural rate, one will find that the rubber band gives very little assistance.

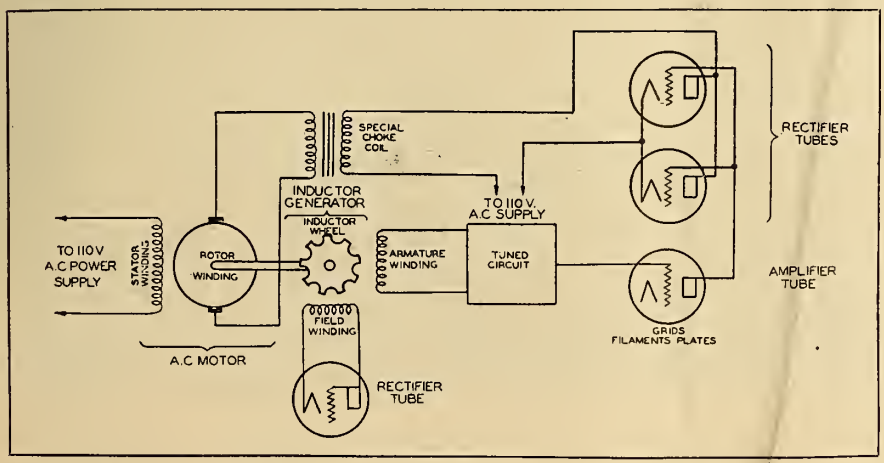


Fig. 2. Simplified diagram showing action of A. C. motor and control box

The "Tuned" Circuit

In other words, this is a mechanical arrangement which readily permits back-and-forth movement at a certain frequency, but which offers considerable resistance to movements at other frequencies, just as we previously said was the case with a "tuned" circuit. It has a mechanical "resonance" effect. Any combination of mass and elasticity will act the same way—for instance, that is the reason why the prongs of a tuning fork display their property of vibrating at a constant pitch.

Now, in electrical engineering a choke coil or inductance has the same effect on an electric circuit that a weight (or, more properly, a mass, such as a flywheel), has on a mechanical device, and a condenser

(*Continued on page 28*)

RCA Photophone System

Prepared by STANDARDS DIVISION, RCA PHOTOPHONE, INC.

The first complete technical description of RCA Photophone to appear in any publication. The new RCA projector, a general description of which appeared in the December issue, will be described in detail in an early issue—probably the next.

ANY system which reproduces sound from film may be divided into three general classifications. First, the pick-up device; second, the amplifying device; third, the loudspeaker. It is evident that fundamentally all systems for reproducing sound from film are similar. There is a lamp, and the light from this lamp passes through the film on to a light sensitive cell. The output from this cell is amplified and fed into the loudspeakers. In the matter of connecting the light sensitive cell to the amplifier, the RCA Photophone system of sound reproducing equipment differs from others.

It had been assumed that owing to the inherent characteristics of the light cell it was necessary to locate the first amplifier alongside this cell or very near it. This meant that a portion of the amplifying equipment had to be mounted on the projector itself. It was found that by using a suitable photo-electric cell and specially designed transformers it was possible to locate the amplifier at some distance from the photo-cell itself. This difference has meant a reduction in the amount of equipment attached to, or located adjacent to, each projector.

With this system all that is necessary as part of the regular projection equipment is some device which will cause the film to be drawn through the sound equipment at absolutely constant speed, and a lamp to be used as a photo-cell exciter lamp, the photo-cell itself, and the photo-cell transformer. All of the amplifying equipment is then located in one unit, usually in the back of the projection room, where there is more space available and the equipment is more accessible.

One other point also influenced the engineers of RCA Photophone and its associated companies in the development of this system. It is well known that the ordinary vacuum tube is quite sensitive to mechanical vibration as well as to electrical signals. If the tube in an amplifying system is struck even a light blow, an unpleasant thump will be heard in the loudspeakers. If the tube is placed where it is constantly vibrating, these vibrations may be heard in the loudspeakers. Thus, if a portion of the amplifier is located on the projector proper, there is some possibility of the vibrations being transmitted to the loudspeakers so that they will be heard in the theatre. With the RCA Photophone method of pick-up, these objectionable features are eliminated.

For high quality reproduction, every element in the reproducing system as well as in the recording system must be as nearly perfect as possible. The various units going to make up Photophone recording and reproducing apparatus approach this perfection more nearly than was thought possible a short time ago. It is well known that high quality sound reproduction should contain all frequencies from about 60 cycles to at least 6,000 cycles. The amplifying equipment used by RCA Photophone has been designed with this end in view and the amplifiers have been made to reproduce all frequencies from below 60 cycles to well above 6,000 cycles, in practically equal amounts. With such a range as this it is possible to reproduce recorded sounds or music with a high degree of fidelity.

Loudspeakers

RCA Photophone loudspeakers are of the moving coil cone type and were selected after extensive tests of all present-day loudspeaking equipment. Each cone is 12 inches in diameter and is mounted with a special suspension to allow freedom of motion of the cone. The number of loudspeakers in use in any installation will depend upon the type of amplifying equipment installed and is, of course, governed by the size of the house and its acoustic qualities.

Methods of Mounting

Reproducing equipment is supplied in several types, one type to operate each combination of 4, 8, 12 and 16 loudspeakers. The loudspeakers are mounted in groups on the side and above the screen and directed into the auditorium in such a way as to secure the best possible sound distribution.

Four methods of mounting the loudspeakers are available. In theatres de-



A disc recorder which cuts the initial record on RCA recording. The "wax" is placed on the turntable and the cutting performed by a sharp cutting point affixed to an electro-magnetically operated cutting arm

voted to motion pictures only, the loudspeakers may be mounted permanently. In theatres where it is necessary that the loudspeakers be removed from the stage, three types of mountings are available. In one of these the loudspeakers are mounted on each side of the screen on racks, portable on rollers, so that they may be removed to a point behind the wings when not in use. The second method of mounting is that in which the loudspeakers are of the fly type so that they may be pulled up above the stage at the same time that the screen is raised.

Combination Mounting

For the third type, RCA Photophone manufactures a special frame for a combination screen and speaker mounting. The screen and loudspeakers are then installed so that they may be flyed as a single unit. In some installations those speakers which are located alongside the screen may be mounted portable on rollers and those above the screen may be mounted either permanently or flyed. The method of installing the loudspeakers will depend upon the type of theatre.

Angle Mounting

The loudspeakers are mounted in a heavy wood baffle board which aids in the reproduction of low frequencies and in securing perfect sound distribution throughout the theatre. There are two types of loudspeaker units, one being that in which the plane of the loudspeaker cone makes an angle of 45 degrees with the baffle board, and the other being that in which the cone of the speaker makes an angle of 15 degrees with the baffle board. These loudspeaker units may be mounted so that the individual speakers point in a number of directions, thus preventing any directional effect. In theatres which have exceptionally high ceilings or two balconies, two or more of the loudspeakers may be turned upward so that the volume of sound in the balconies will be the same as that on the main floor.

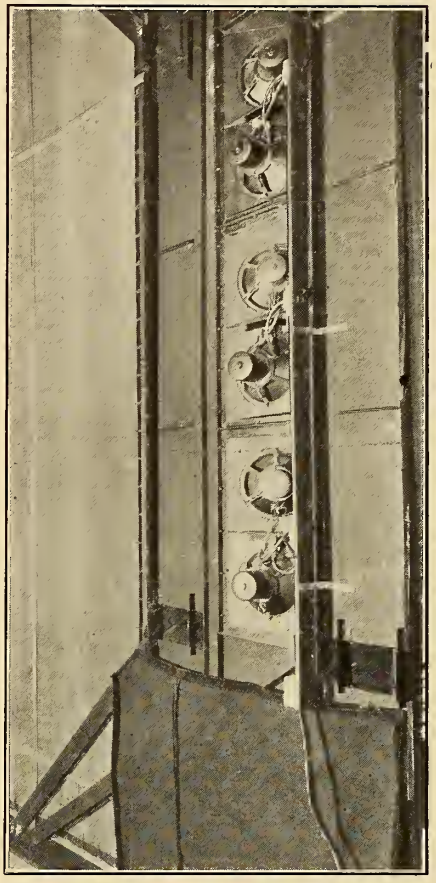
Projection Room Control

The cone type speaker radiates sound over a wide angle, and by employing a number of these speakers properly located about the picture screen, uniform volume is produced about the entire theatre and directional effects are minimized. The result is that the sound appears to come from the screen itself.

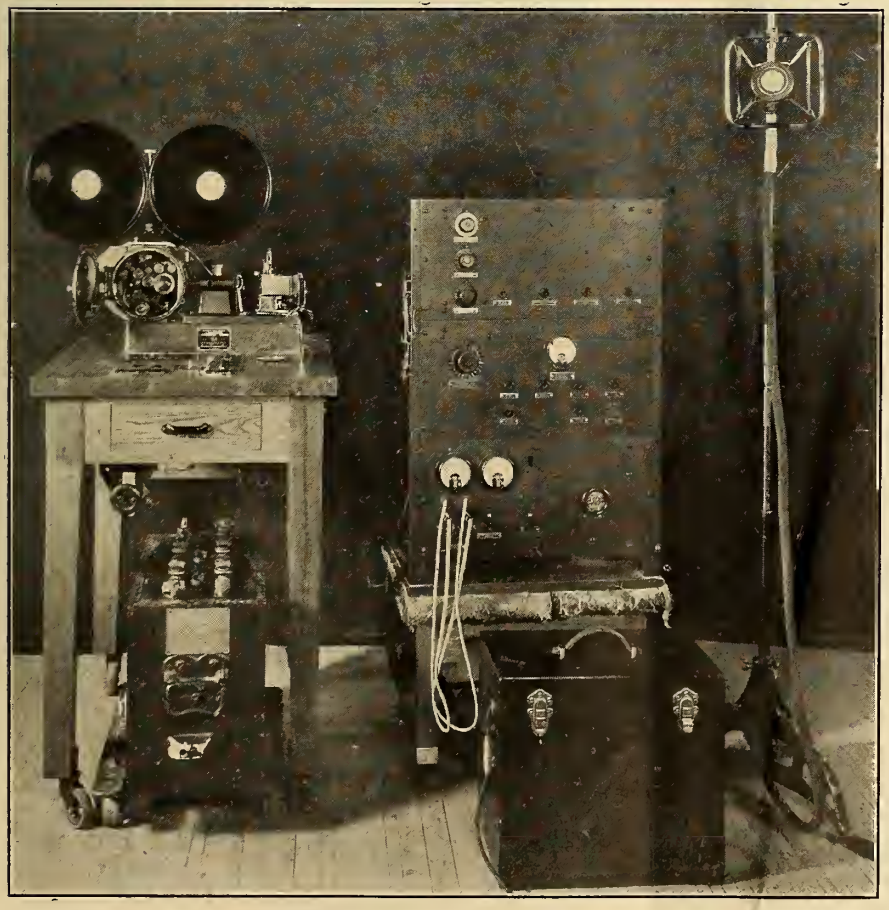
In each type of installation made by RCA Photophone the loudspeakers are controlled entirely from the projection room. Provision is made so that if any trouble develops in a loudspeaker or a bank of loudspeakers, this particular group of speakers can be removed from service and the show continued with the remaining groups.

Amplifiers

RCA Photophone manufactures five types of amplifying equipment for the theatre installation. The type of amplifier installed depends upon the size of the house and its acoustic properties. For the largest houses the equipment is known as Type "A" and for the smallest houses as Type "D," with the remaining types for intermediate size houses. There are two types of amplifying equipment known as the "B" equipment and these equipments are distinguished by the letters (MG) and (SPU). These two types of equipments have been designed for the same size houses and differ only in the source of power and for this reason have been given the same type letter.



Bank of six speakers which are mounted at either side of screen. The two banks are flyed together and the screen is flyed separately. Obtainable as one unit, also. An exclusive RCA feature.



RCA recorder. The microphone, at right, is connected by short flexible cable to first amplifier in box. Behind this is main recorder amplifier and mixing panel, which combines currents from a number of "mikes" into one current which is fed thru amplifying system. At left is the recorder.

Amplifiers "A" and "B" (MG)

RCA Photophone manufactures two types of equipment supplied by power from motor-generator sets. The Type "A" equipment consists of either two RCA Photophone projectors or two standard projection machines equipped with RCA Photophone sound attachments, two amplifier racks, one of which is a spare, two 4-unit motor-generator sets, four storage batteries, twelve RCA Photophone electrodynamic 12-inch cone type loudspeakers, and all necessary installation and operating accessories. The amplifiers, together with the 4-unit motor-generator sets and storage

(Continued on next page)

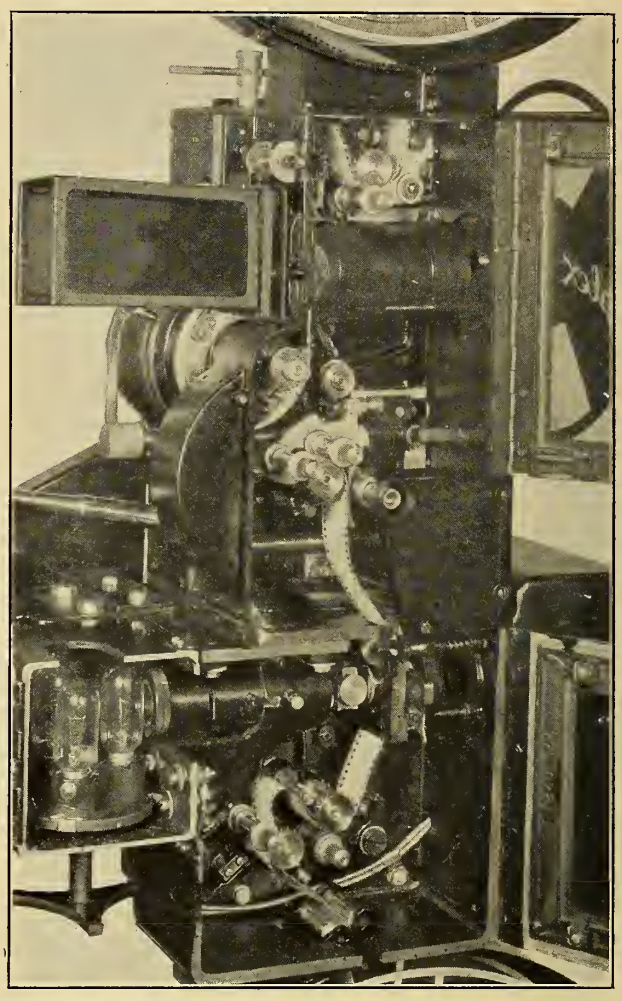
batteries, are furnished in duplicate. Only one amplifier is used for regular show operation. The other is kept in readiness as standby equipment, and in case of an emergency may be placed in service in a very short time.

The power supply for the 4-unit motor-generator sets may be either 110 volts DC or 220 volts, three phase alternating current. Each of these MG sets is provided with approved fused line switches and with automatic starters remote controlled from the amplifier racks.

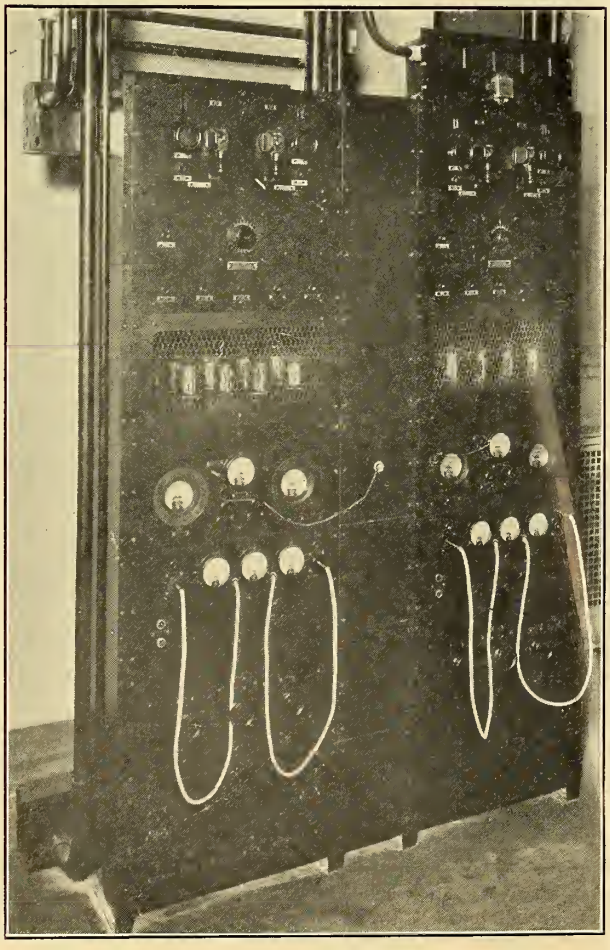
The Type "B" (MG) equipment consists of two RCA Photophone Projectors or two standard projection machines equipped with RCA Photophone sound attachments. One amplifier rack, one 4-unit motor-generator set, two storage batteries, twelve RCA Photophone electro-dynamic 12-inch cone loudspeakers, and all necessary installation and operating accessories. The amplifier used in this equipment consists of one voltage amplifier and two power amplifiers. Normally the two power amplifiers are used, each amplifier operating 6 of the 12-inch dynamic cone speakers. The power amplifiers are so arranged that in case one fails the show can proceed with one amplifier. The 4-unit motor-generator set used with the Type "B" amplifier is similar to the one used in the Type "A" equipment.

The Types "A" and "B" equipments are similar in construction and operation. The Type "A" equipment has duplicate amplifier racks and affords a complete standby equipment, whereas the Type "B" equipment has one rack with two power amplifiers, and in case of emergency this equipment may be operated with only one of the power amplifiers.

It is to be noted that all power for the "A" and "B" (MG) amplifier is supplied by motor-generator sets, thus eliminating the necessity for batteries. The two storage batteries with each equipment are used as filters to smooth out generator ripple and are not used as a source of power.



Simplex with RCA attachment which is located just above lower take-up. Path of film and its threading are shown clearly. In upper right-hand corner of sound compartment will be seen slit for optical system. Photocell on right wall of compartment. Three exciting lamps are shown. One is for supplying illumination; the others are spares that may be swung into position at once, being mounted on revolving turntable.



Type A RCA amplifying panels. Starting at top, each amplifier has following: Input panel, voltage amplifier panel, two power amplifier panels, power control panel, rheostat panel. In one amplifier the lowest panel is a loudspeaker sectionalizing panel. The other amplifier has a blank panel at the bottom. In operation, one amplifier is used as a spare.

Amplifiers "B" (SPU), "C" and "D"

RCA Photophone manufactures three types of amplifiers which are operated from a regular 110 volt, alternating current lighting circuit. The smallest of these is known as type "D" and is installed in houses with a seating capacity of 750 or less. With this type equipment two RCA Photophone projectors or two standard projectors with Photophone Sound Attachments are installed. The same applies to the type "C" equipment which is used for houses seating up to 1,500, and the type "B" (SPU) for houses larger than 1,500.

With each of these equipments an input control panel is located on the front wall of the projection room. This panel has meters and rheostats for controlling the current in the photo-cell exciter lamps; a change-over potentiometer for changing from one machnie to the other; a volume control and a volume indicating meter. Unlike the two equipments previously described, these types have no high voltage

(*Continued on page* 17)



TELLING YOUR PUBLIC

National advertising to show how Sound Pictures were made possible by Western Electric with the co-operation of progressive producers and exhibitors.

"Science, art and business, working shoulder to shoulder have accomplished it." This statement is made in the first of a series of advertisements on Sound Pictures, to be published this year by Western Electric.

These advertisements will set the public straight on three important facts—

First, that Western Electric made the first successful Sound Picture system—a development of the Bell Telephone Laboratories. *Second*, that leading producers have faced the difficulties of the new studio technique and, with the help of Western Electric equipment, are making better and better Sound Pictures. *Third*, that exhibitors in more than two thousand theatres have shown characteristic eagerness to serve their patrons by equipping with the Western Electric Sound System.

This is your advertising, selling your customers in millions of homes, month after month. It will give the nation a better understanding and a greater appreciation of what Sound Pictures are and where they are going. Here is an authoritative interpretation of a great new art in which the moving picture industry is making a tremendous investment.

Thus to its recognized services as manufacturing pioneer and technical sponsor of Sound Pictures, Western Electric now adds the important role of interpreter.

Electrical Research Products Inc.
250 WEST 57th STREET, NEW YORK

The Western Electric Sound Picture advertising will appear during 1929 in the following publications, the first advertisement, reproduced above, to be in:

THE SATURDAY EVENING POST, April 6
LIBERTY, April 6
COLLIER'S, April 6
LIFE, April 5
THE NEW YORKER, April 6
TIME, April 8
PHOTOPLAY, May
MOTION PICTURE MAGAZINE, May
MOTION PICTURE CLASSIC, May
COLLEGE HUMOR, May
AMERICAN BOY, May

Western Electric
The VOICE of ACTION
SOUND SYSTEM

As The EDITOR Sees It

¶ *Sound Pictures March On*

OPINION among projectionists still seems to be divided as to the ultimate importance of sound pictures. There is a large group that is firmly convinced that sound pictures have come to stay and that they will assume an increasing importance with the passing of time. This group believes in preparation; it is evidenced by its eagerness to avail themselves of all educational media. It is from this group that men have gone to assume charge of sound projection throughout the country—at greatly advanced pay. The rest still scorn sound pictures, have refrained from learning about them, and, of course, are still at their old jobs.

We are mindful of the fact that at present there are not sufficient sound picture jobs to go around. Only about three thousand theatres have, or have signed up for, sound installations. Several factors have combined to slow up the spread of sound installations—principally, we believe, because it was a new phase of the routine picture business and exhibitors were a little bit uncertain about its permanency. The price was too high for the smaller theatres. But now the permanency of sound in the picture business is established and equipment is being made for all types of houses at reasonable prices. Sound installations will become more numerous. And more *good projectionists* will be needed.

¶ *Competence, Carefulness, Education*

OUR little mathematical calculation on the cover of this issue is the best formula for success. Reward comes to those who continue to educate themselves, who combine experience with careful work and who are thus able to render as perfect projection as it is humanly possible to render under given conditions. The whole is reflected in a serious attitude toward one's work.

Perhaps some of our readers are becoming bored by our continued insistence upon the need for education. Though that may be, we do not intend to relent, but on the contrary to redouble our efforts to bring about an increase of educational facilities for the craft, no less than to develop an eagerness in the craft to take advantage of them. In this work we are encouraged by hundreds of projectionists from every corner of this country and from Canada, whose frequent letters to us are an inspiration. We are also encouraged by the attitude of responsible manufacturers and theorists who are becoming more cooperative in the form of material placed at the disposal of our thousands of readers.

¶ *More Critical Audiences*

IN the enthusiasm for sound pictures (because it means so much to the prosperity of the craft), we have not lost sight of the fact that the old problems of good projection are still and always will be with us. Clean equipment, fire prevention, good lighting, clean film—these and many others are not part of sound picture work, but part of the work of projection as a whole. Although we are all laying stress on sound because it is a new development, even sound must be projected in the regular manner, and so these same problems must be studied and overcome. Only sound has made the solution of such problems more imperative.

Audiences have always been critical and have been quick to note deficiences in projection. Sometimes inadequate projection would excite a laugh and sometimes it would arouse disgust. But since only one sense was employed in the enjoyment of pictures—sight—criticism was naturally confined only to those factors which disturbed the eye. Today we have enlisted the ear of the audience, and the ear, in its own sphere, is much more on the alert than the eye. Except for such elements as are due to imperfect recording of sound, the burden of keeping this new critic pleased lies wholly with the projectionist. It's a big job; but we feel that the craft is entirely adequate to cope with it—as indeed it has already proven to the satisfaction of the most exacting sound producers.

There are great times ahead for the craft and for the individual projectionist.

¶ *Miehling on Sound*

AS many of our readers may have already noted (in the February issue), this paper is shortly to publish a book on sound written by no less an authority then Rudolph Miehling, supervisor of sound for the Publix circuit. Mr. Miehling is recognized everywhere as an authority on the subject and we have received much praise for having chosen him to prepare this book for us. Orders are pouring in every day—proving that our readers are responding to our plea for more education. This book will be a complete and comprehensive summary of all existing sound systems with operating instructions, solution of common troubles, etc.

Mr. Miehling's book is the first of a series of books which THE MOTION PICTURE PROJECTIONIST will publish during the year, all of them dealing with projection. In time a complete library will be at the disposal of the craft. An announcement of the series will be made shortly and the books supplied as rapidly as the manuscripts can be put through the press.

The Fulco Projector

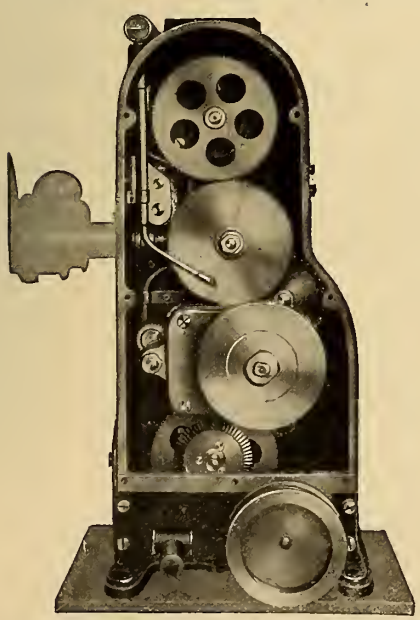
By F. McMILLAN, *E. E. Fulton Company*

THE creators of the Fulco projector set about to develop a machine to fit the present day and age. They ignored completely the lines and forms that originated in nickelodeon days, lines and forms that are dominant in projector design and construction to this day. In other words, they completely forsook the "horseless carriage" age of motion picture projector design and visualized and achieved something strikingly new, different and wholly modern.

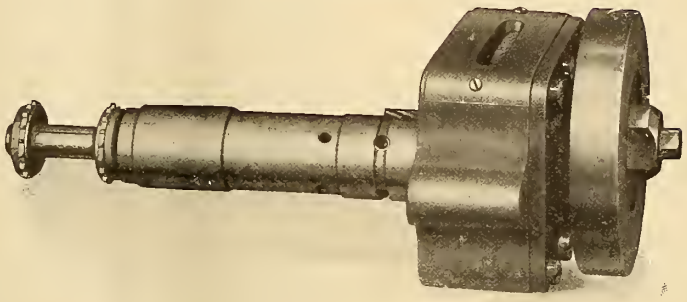
Beauty of line and all around symmetry are clearly apparent in the accompanying picture of the Fulco projector. All elements are in perfect proportion, giving a neat balanced effect and with the appeal of really artistic lines. Also, there is every evidence of rugged, durable construction in all parts. Last, but not least, a superlative finish makes this projector a treat to the eye and a delight to the trained mechanic. This combination of rugged strength and clean-cut lines makes for splendid performance.

Some Novel Features

It is common knowledge, of course, that projector design has improved not at all since the first days of the motion picture. A change here and there has hardly been sufficient compensation for the continued adherence in design and construction to antequated forms. The Fulco projector records a degree of developement in projector design equalling the improvements, architecturally and otherwise, achieved in present-day picture theatres. No machine is more completely in harmony with the advanced ideas embodied in modern de-luxe houses.



The Fulco "works" assembled in oil-tight compartment, with all parts being oiled by an automatic feed.



The intermittent sprocket shaft which is supported in an extra-long bearing.

Considering the more external features, we see a pedestal of very pleasing design which, while carrying no unnecessary weight, is sufficiently sturdy to assure absolute steadiness. Within this pedestal all wires are concealed. A generously proportioned piston (ball bearing mounted), is controlled by a screw which allows circular adjustment and affords means for vertically raising or lowering both the machine and the lamphouse. The longitudinal table carried by this piston and upon which is mounted lamp and machine, is provided with a very novel and efficient device for tilting and locking the machine to any desired pitch.

Where the angle of projection must be changed speedily—as is the case in some houses using both forward and rear screens—the adjustment from one position to the other may be accomplished instantly. The motor is suspended from a swiveled mounting with a spring pressure which automatically applies just the right tension to the belt at all positions of the machine.

No belt-tighteners or screw adjustments of any kind are needed. This combination of roomy pedestal and piston with subframe for motor and tilting device, together with a very substantial cast iron horizontal table, is an assembly unexcelled for neutralizing all vibration and assuring steady projection. The magazines are of 3,000-foot capacity and, like all other parts of the equipment, are very substantially built. The upper magazine shaft is mounted in "barium" metal, and the lower magazine shaft runs on ball bearings.

New-Type Mechanism

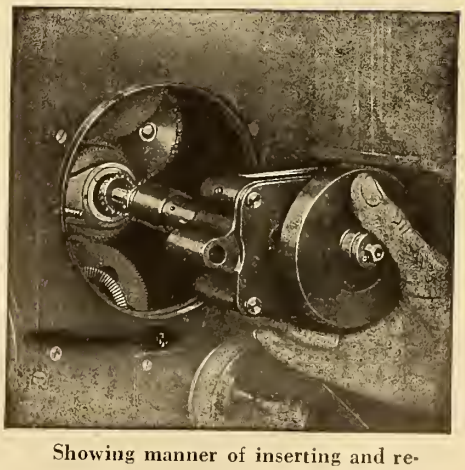
The mechanism—of Ernemann design—has a wealth of unique features, all of which will be highly appreciated by every projectionist. No detail of practical projection has been overlooked and the working out of practical projection problems shows projection experience, expert handling and a high degree of ingenuity.

It is hardly necessary to point out that all parts are made of materials especially suited to the purpose intended and are finished with a degree of accuracy hitherto unknown in this class of apparatus. The gearing compartment of the mechanism has a visible feed oil system including a rotary pump which automatically functions when the machine is in action and literally drenches and floods all gears, cams, shafts, and the intermittent movement with lubricant. The ball bearing intermittent action is a unit assembly, which may be taken out in a moment by simply removing one nut. In removing sprockets—feed, take-up, or intermittent—nothing but a screw driver is necessary. The same tool will also release guide rollers, etc. In fact, any job which any projectionist may safely attempt on this mechanism may be done with a screw driver.

The threading operation is a very simple and convienient one, the film passing through a very long gate having lengthy shoes which may be instantly removed and replaced, if occasion arises. Tension on the film may be varied at will while the film is in motion. Special shoes are provided for accommodating freshly made films which tend to stick as they pass through.

The film gate is constructed with numerous fins to insure rapid radiation of heat from lamp and the automatic fire shutter is

(*Continued on page* 16)



Showing manner of inserting and removing the intermittent movement. A small nut is removed and the intermittent slides out.

MIEHLING ON SOUND!

by

Showing *ALL* Sound Systems



Mr. RUDOLPH MIEHLING

Over 100 Illustrations

Mr. Rudolph Miehling is a nationally-known figure in the world of projection.

He is a graduate of Columbia University, holding an engineer's degree. Prior to his entrance into the motion picture industry he was on the staff of several of the country's most famous electrical engineering corporations. For years before sound became a commercial fact, he fought for the realization of sound with pictures and made many experiments to prove his contentions.

With the formation of the Electrical Research Products Corporation, (Erpi) he was made Chief Installation Engineer, his knowledge of the practical requirements of projection making him one of the most valuable members of the staff of this company. He was taken away from Erpi by Publix as soon as this company decided to go into sound and appointed Advisor on Sound Projection for the Publix Circuit with the whole country as his laboratory. He has the respect of the whole sound picture world.

From this it may be seen that no one in the motion picture industry today can speak with greater authority on sound and sound problems and the operation of sound equipment, than Mr. Miehling.

Mr. Miehling has personal contact with all research and laboratory work now going on in the United States on sound and brings to his book a vast knowledge of actual and theoretical work that will shortly be realized commercially and placed on the market.

Mr. Miehling has written this book from the viewpoint of a practical projectionist.

He describes all existing sound systems with wiring hookups, methods of operation, etc.

He gives full details of amplification, recording and projecting under all conditions in all kinds of theatres.

He lists all the common problems of sound projection and gives careful instructions on how to overcome them.

He lists over 100 illustrations showing details of each system, getting at the insides of them, to enable the projectionist to better understand his equipment.

The book is written in everybody's language—not too technical, easy to understand and absorb; but without the use of too many technical and abstract words he has succeeded in conveying the completest technical exposition of sound projection yet written.

Mr. Miehling's book will become the standard reference book for serious projectionists who wish to educate and advance themselves as rapidly as possible.

A complete announcement as to price, etc., will be made soon. Prepare yourself to obtain a copy of this valuable book. No projectionist's understanding of his work will be complete without Mr. Miehling's careful and painstaking description of the entire field of sound projection.

250 copies sold before publication to libraries, laboratories, etc.

WATCH FOR FURTHER ANNOUNCEMENT!

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THE MOTION PICTURE PROJECTIONIST

45 West 45th Street New York City

Vacuum Tube Elements

By GEORGE W. BARZEE*

VACUUM tube amplifiers and their components have been discussed time and time again, but it is not often that the subject is attacked in a way which will enable the layman to immediately grasp a fair understanding of the how and why of this rather complicated-looking piece of apparatus.

Obviously, the main part of an amplifier is the vacuum tube and it is this which will be treated in this article. It is assumed that the reader is familiar with simple electrical circuits and understands that current flows in direct proportion to the voltage and in inverse proportion to the resistance of the circuit, but this fundamental information is not necessary even though desirable.

Vacuum tubes are called valves in Europe, which is a much better name for them as that is just what they are—electrical valves.

Let us first see just how a mechanical valve can and does amplify. In Fig. 1 imagine a steady flow of water in both troughs, T^1 and T^2. Now, if waves are set up in T^1 they will cause float (A), to rise and fall which will in turn give the same motion to the gate or valve (D), through the coupling system (BCB). Now, although the length of the stroke is the same for D as it is for A, there is a larger wave created in T^2, because of its greater width.

Tube Components

If the coupling link is pivoted at E instead of at C, we will have a "step-up" ratio of 1 to 2. In other words, D will move twice as far per stroke as A, giving greater amplification than before.

* Amplifying Consultant, G. Barzee Co.

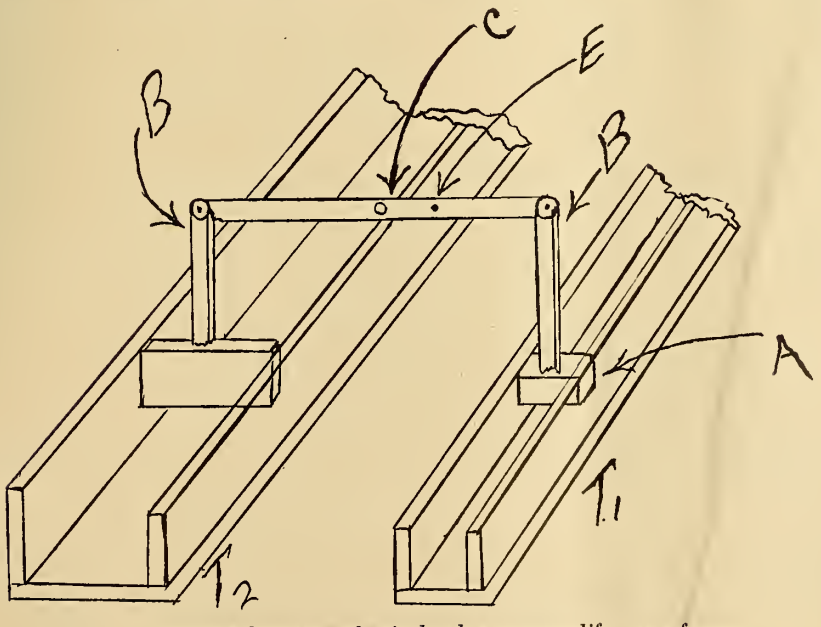


Fig. 1. Showing how a mechanical valve can amplify wave forms

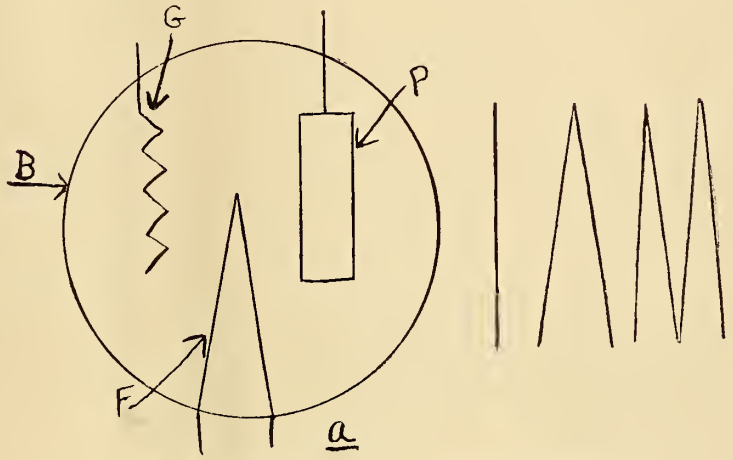


Fig. 2. Standard symbol for a vacuum tube

Now refer to Fig. 2, section *a*, which is the standard symbol for a 3-element tube. The parts of a tube are: B, glass bulb; F, filament; G, grid; and P, plate.

The filament is usually of the straight, inverted V or M type, as shown in Figure 2; however, it may be in any other form which is found desirable and convenient. The filament serves to form an electrical path or conducting medium between itself and the plate by discharging electrons (minute negative charges of electricity), from itself to the plate.

The plate, being connected to the positive side of an external source of current readily attracts these electrons just as the south pole of one magnet would attract the north pole of another magnet.

Any material will give up electrons, if heated to incandescence, whether by electrical or any other means. Some metals and their oxides, however, require less heat than others; but as electrical heating is the only practical method to use inside an evacuated bulb, these are used in present day manufacture.

In the assembly of a standard tube it will be noted that the grid is a spiral of fine wire wound around the filament, and that the plate is a solid strip of metal enveloping the other two elements. These elements, do not, of course, touch each other, as we depend upon the "flow" of electrons to carry the current.

The Grid Control

Figure 3 shows how the grid controls the flow of electrons, or, in other words, how it acts as a valve in the electrical path between the filament and the plate. The tube elements are lettered the same as in Fig. 2, with the dots representing the electrons. As previously stated, these electrons, being of negative charge, are attracted to a positively charged object, such as the plate, thus allowing current to flow between the two in proportion to the amount or number of electrons reaching the plate.

Here is where the grid comes into use, and the manner in which it controls the electron flow according to the electrical charge (voltage), it receives may be best explained as follows:

When the grid has no charge nearly all of the electrons go between the wires of which it is made and reach the plate. When the grid receives a positive charge, the filament is encouraged to part with more electrons than usual and, although many electrons are attracted to the grid (due to its positive charge), the flow to the plate is also stimulated and more current flows between the filament and the plate.

A negative charge produces just the opposite effect, inasmuch as it repels the

(*Continued on page* 33)





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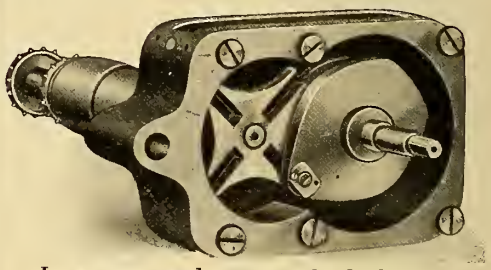
(*Continued from page* 13)

the most sensitive and responsive ever designed. Feed and take-up sprockets are twice the diameter of the intermittent sprocket and all three are removable with the aid of a screw driver.

Framing Control

Framing control is effected through a sizable circular knob, conveniently placed at the side of glass door of mechanism. Framing does not effect the shutter in the slightest degree, nevertheless an adjusting thumb piece, located above the lens mount permits accurate shutter adjustment while machine is in action. The ball bearing shutter is secured to the shaft in a manner which positively prevents slippage, and it may be set to any position on the shaft without loosening or setting a screw. The shutter shaft may be extended to suit lenses of almost any focus.

The film speed indicator which forms part of the mechanism, enables the projectionist to know exactly the rate at which film is moving and furnishes the visual report of the functioning of the speed control attachment. At the bottom of the mechanism, a small brake lever presents a convenient



Large star and cam, with double support for cam pin

means for slowing up the film at titles without disturbing film speed adjustments. One simply applies brake pressure to the power wheel on the opposite side of mechanism and slows up the machine just for the moment it is needed.

The speed control located just above lower magazine is extremely compact and efficient. It is of the governor type and is so designed that the automatic control elements are concealed within the rotating drums. Five ball bearings of highest grade are used in the construction of this device and it will be found to be the easiest running, the most accurate and the most dependable control yet devised.

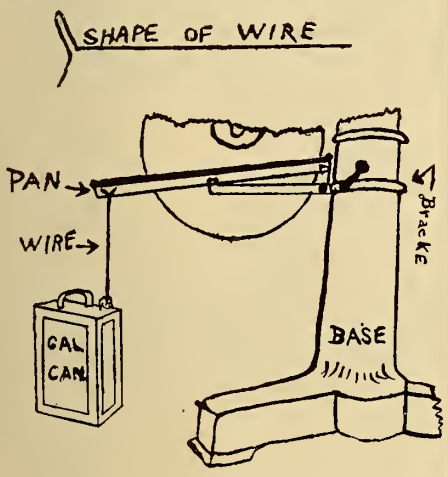
An idler pulley riding the slack belt from speed control to mechanism is attached to a spring tensioned lever, giving an additional factor of control to the projectionist. The machine may be started from the motor switch, or if preferred, may be started any time and machine started or stopped through the belt idler. Speed control may be adjusted in advance and when the idler is thrown forward the machine responds instantly, to pre-determined rate of speed. All controls—governor, idler release, motor switch, and lamp switch—are operative from *either* side of machine.

In summing up the merits of the new Fulco Projector it is evident that it is in every sense strictly up to the minute, a fitting fixture suited to any theatre desiring fine projection results.

A Neat Stunt

THE following stunt has been found very effective in preventing the oil from the projector from dripping on the room floor. First, get a half-size baker's pan (they measure 17½" long by 11½" wide and are 1" high), or any other similar pan, and by means of a wire or a bracket made of strap iron and a bolt fasten it on to the projector about 18" up from the floor.

The pan should be attached on a slight angle to one corner. In the lowest corner bore a small hole through which insert a piece of Y-shaped wire, as is shown in



the accompanying sketch. The lower end of this wire should be led into an empty gallon can. The dripping wire then runs to the lowest corner of the pan and then down the wire into the can.

When the can is full drain off the oil and use it to lubricate the springs of your car and to take out body squeaks. This simple stunt is shown very clearly in the sketch.—BILL COX, Local 306.

Smallest "Sound" House

The Roxy in New York City, with 6,000 seats, is the largest picture theatre in the world to have sound picture equipment—but! Detroit lays claim to having the *smallest* theatre so equipped. This is the Blackstone Theatre, Michigan Avenue, which has only 288 seats.

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RCA Sound System

(*Continued from page* 10)

lines entering from the outside, but are constructed with rectifying units for supplying plate voltage. The three types are essentially the same, the only difference being in the number of units installed.

Type "D" Equipment

The Type "D" equipment has one voltage amplifier unit and one power amplifier unit and operates four 12-inch dynamic cone loudspeakers. The Type "C" equipment has two voltage amplifier units, one of which is not in use but is held as standby equipment, and two power amplifier units, both of which are in use feeding eight dynamic speakers. The Type "B" (SPU) has two voltage amplifier units, one of which is a standby, and four power amplifier units, all of which are used to operate sixteen loudspeakers. In case of trouble with the voltage amplifier unit, it is possible to switch to the standby by throwing a series of three switches. This operation takes less than one-half minute. In case of trouble with a power amplifier unit, this particular unit is cut out and the show run on the remaining units.

Separate Controls

Each power amplifier and voltage amplifier unit is provided with its own controls and is operated independently of the others. All of these amplifiers use the standard RCA Radiotrons. Filament current for the voltage amplifier units and for the photo-cell exciter lamps is furnished by a storage battery. Each installation has two storage batteries, one for use while the other is being charged. All wiring from the projectors to the amplifiers, and from the amplifiers to the batteries and loudspeakers, is pulled in suitable conduit and concealed. For installations where the theatre does not have 110 volt, 60 cycle, alternating current supply available, convertors or transformers for changing to such power are installed. Two convertors are supplied with Types "C" and "B"

(*Continued on page* 20)

In the Mail Bag

IN response to an article which appeared recently in these columns anent the Australian Exhibitors Association's plan to pass along the charges on mutilated film to the guilty party, whether it be exhibitor or projectionist, we received the following interesting comment from E. Baumer of Peterboro, Ont, Canada:

Of late, I have read much in THE PROJECTIONIST about the bad film problem, and I have been very much interested in the various "cures" set forth by different parties. Thus far, the work of the Detroit Film Committee, of Local 199, is the only serious attempt made to find a corrective for the nuisance.

When writing in to you, correspondents refer to these careless men as "projectionists." What a name for them! They should more properly be called "film butchers." We have these pests in Canada, also. Every feature we receive from Toronto is butchered—that is, about a foot at the end of each reel, irrespective of whether it is a new or an old film, a two-reeler or a twelve-reeler. The number of cue marks are large and varied—paper stickers in square, oblong and round forms; pin scratches, holes in profusion and other products of the imagination.

"Film Butchers"

I don't know to what purpose all these cabalistic signs are. Any projectionist who can't run film through a projector without all these signs ought to have his license cancelled and be returned to following the horses. I would like to see one of these butchers hold a job on the Continent (Europe) and follow these tactics; he would last about one week, if that long.

These men do all sorts of harm to the business, making it tough both for themselves and showmen. I personally can't see why all these signs are necessary; some of the smart alecs will say it is for cueing. To me this explanation is all bunk, for any man who says this must have the brain of a hare. If a man would watch his show closely on the first run, he wouldn't need any cues at all. The trouble with this method, however, is that it requires a man who is alive and awake, which is just what these pseudo-projectionists *are not*. That's my story, and I'll stick by it.

It is evident that Mr. Baumer has very definite ideas on this subject of bad film, and his conclusions as set forth above are accordingly passed along to the craft for consideration. It would seem that somewhere there is someone within the craft who is sensitive at least to Mr. Baumer's remarks about the requirements on the Continent, if not to the remarks about bad film.

Additions to Nomenclature

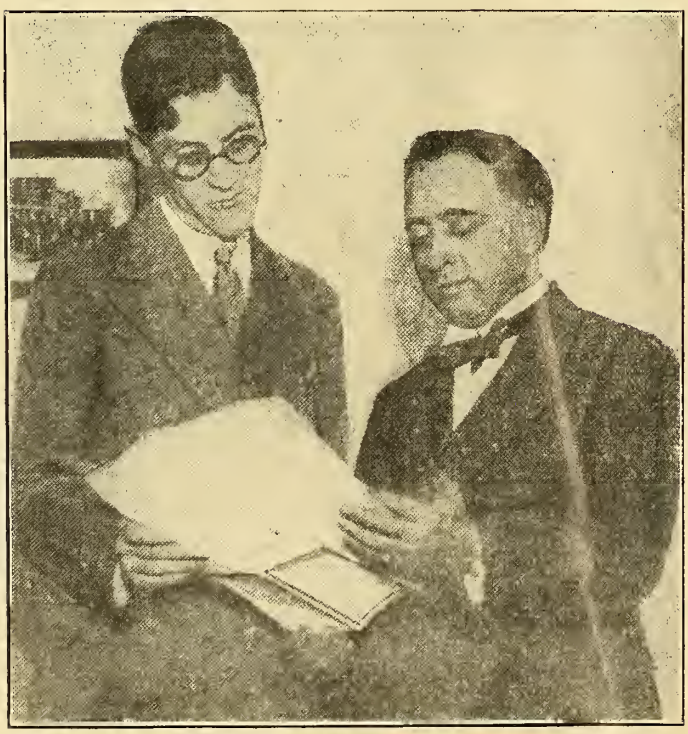
But Mr. Baumer is not yet done. He also offers a little contribution which he asks be considered as an extension of the remarks regarding the additions to nomenclature which appeared in these columns last Fall. In this contribution Mr. Baumer sustains his reputation for outspokenness and thoroughness which he corralled in his previous efforts. His remarks follow:

In one of your issues last Fall I noticed that Mr. L. Hill of St. Petersburg, Florida, offers some suggestions under the heading "Additions to Nomenclature." Under the sub-head "Aperture" he asks if this is the only opening the light passes through. And I rise to answer, "Sure it is."

The aperture and the lens are the only openings on the projector where the light passes through; and another thing, a projector is never inclined 20 degrees from the vertical *at the aperture*, and the film *always* passes vertically at the aperture.

Then, under the heading "Geneva Movement," there was offered the following: "A form of intermittent movement first used in Geneva, Switzerland, hence the name." I have been in the picture business since 1900, and have worked with Messter, Edi-

(*Continued on page* 32)



President Canavan receiving from Mathew Woll, Pres. of the Union Labor Life Insurance Co. a group policy, under which any Local in the Alliance may secure insurance for its members, without regard to numbers.

Local 171—Pittsburgh, Pa.

The following contribution by Secretary A. L. Criswell of Local 171, Pittsburgh, merits the close attention not only of Local Unions in Pennsylvania but throughout the Alliance. Legislation of this sort is ever dangerous in threatening the fraternal prerogatives of Local Unions, and in this particular instance the vicious character of the proposed law should forwarn Local Unions within the Alliance of the necessity for perfecting plans to combat these moves. Secretary Criswell promises to have more to say on the matter at a later date, so soon as the course of the bill in the Pennsylvania Legislature is properly charted and plans are perfected for insuring its defeat.

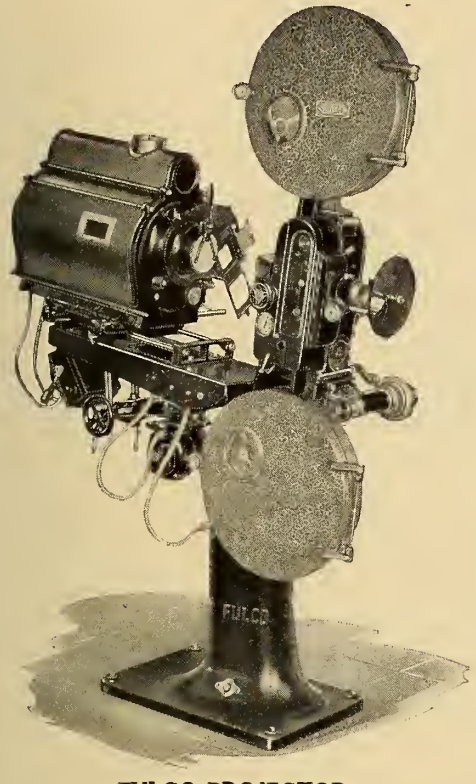
CONSIDERABLE interest has been shown by the locals throughout the country in the midnight benefit shows which have been staged by Local No. 171 with the cooperation and assistance of the Theatrical Managers' Association of Pittsburgh for the benefit of the Relief Fund. The members of the Relief Association are very glad to announce the complete financial success of the last show given and wish to publicly thank the members of the Loew-Pittsburgh staff for their untiring efforts to make the show a success.

Particular mention must be made of the splendid work of Teddy Joyce who acted as Master of Ceremonies and Livingston Lanning, Manager of Loew's Penn Theatre, the projection room staff of the Penn Theatre, which includes Harry Levin, Harry Spang, Ralph C. Freeman, L. A. Reilly, Fred Iffert and D. V. Flask gave freely of their time to put the show across. The entire performance was under the direction of Eugene L. Connelly, Secretary of the Theatrical Managers' Association and Roger J. McKelvey, Chairman of the Relief Association of Local 171.

* * *

Locals throughout Pennsylvania are up in arms over a bill just presented in the State Legislature which will compel all persons handling electrical apparatus to pass an examination and become licensed electricians. Licenses will be granted by a special board which will be composed of *licensed electricians* and the passage of this bill will mean that members of the International Alliance will be practically legislated away from their fraternal affiliations. A strenuous fight against the measure is being waged by President James A. Sipe of Local Union No. 171 and the Hon. Clayton A. Dietrich, State Legislator, who is also a member of Local 171.

An attempt is being made to tie up all the Locals throughout Western Pennsylvania in this fight and the Locals are confident of ultimate victory. More will be published concerning this bill later and Locals throughout the country are warned to be on guard against the presentation of similar bills in their home states.—A. L. CRISWELL.



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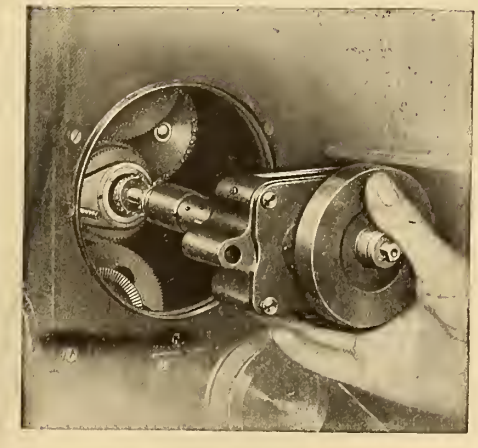
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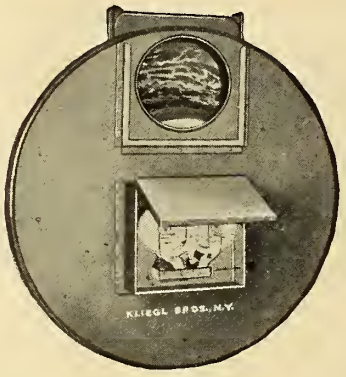
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RCA Photophone System

(*Continued from page* 17)

(SPU) equipment, one to be used as standby equipment. With the Type "D" equipment only one convertor is supplied.

Some Advantages

With the equipments outlined above, the following advantages are evident:

1—All controls necessary for running the show, changing projectors and controlling volume are located on the front wall of the projection room, directly in front of the projectionist and easily accessible.

2—Adequate standby equipment is provided in the larger equipments so that the show will go on even in an emergency.

3—All outside power to the amplifiers is furnished by regular 110 volt, 60 cycle, alternating current lighting supply.

4—All high voltage is completely enclosed within the amplifier and the amplifier itself is enclosed in a metal case.

5—The Type "D" installation can be converted into the Type "C" installation in a very short time by the addition of one voltage amplifier unit and one power amplifier unit with proper inter-connecting cables.

RCA Technical Data

Type "A" Amplifier

IN Type "A" equipment the amplifiers are in duplicate, one being a spare. They are mounted in separate racks placed adjacent to each other. These two amplifiers are identical except that one of them is equipped with a loudspeaker sectionalizing panel.

Starting at the top of the rack, each amplifier comprises the following units:

An input control panel.
A voltage amplifier panel.
A power amplifier panel.
A power control panel and on one of the racks a loudspeaker sectionalizing panel.

The latter space on the other amplifier is occupied by a blank panel.

The Input Panel

The input panel has duplicate controls, one set for each projector. The controls for one projector are on the left of the panel. The controls for the other projector are on the right. For each projector, there is on this panel:

A gang switch, the function of which is to connect the amplifier to the exciter lamp and photo-cell of that particular projector.

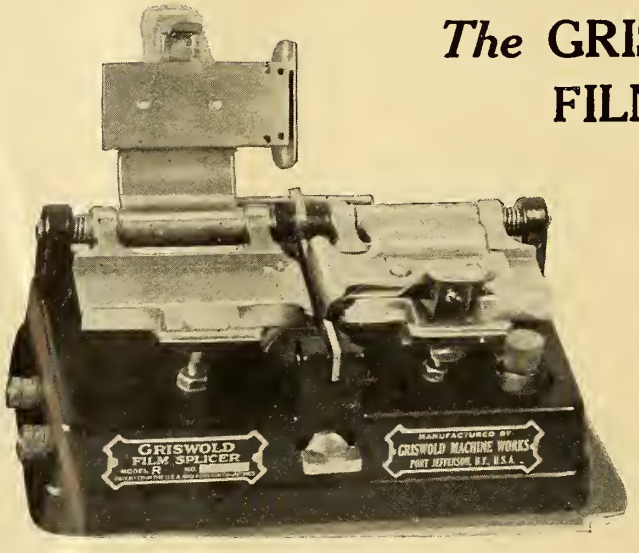
An exciter lamp rheostat to regulate the current of the exciter lamp.

A pilot lamp to indicate which projector is being used and a jack employed in conjunction with the test meter on the control panel to measure the exciter lamp current.

Voltage Amplifier Panel

After passing through the input panel the signal enters the voltage amplifier and passes through three stages of amplification. The signal from the projector first

Mr. Projectionist, Get The Best

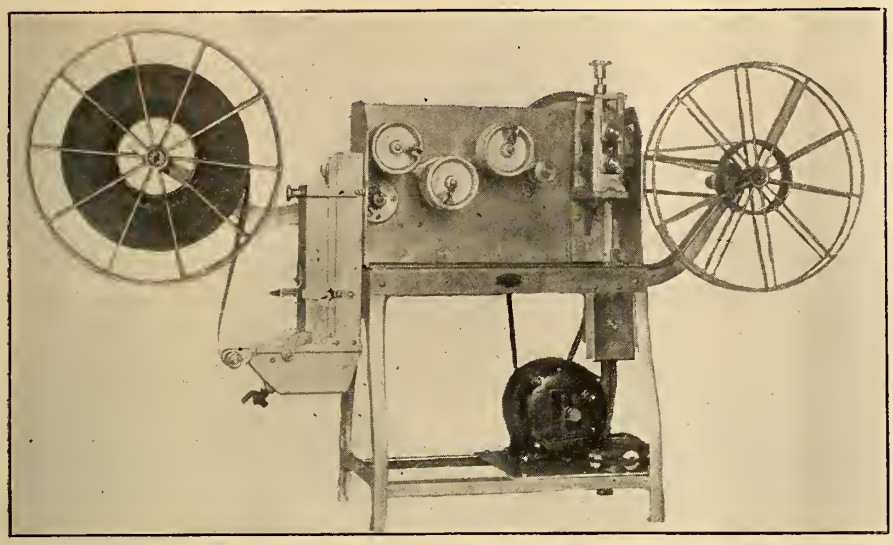


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passes through a transformer similar to that in the projector itself and this transformer applies the signal to the grid of the first tube. This tube is coupled to the second tube by a step-up transformer. The secondary of this transformer is loaded with the gain control so that the signal applied to the grid of the second tube changes with the setting of the gain control. The coupling between the second and third tubes is of the resistance type and the output circuit of the third stage is a combination of inductance and capacity.

By using these three methods of coupling in the same amplifier RCA Photophone has been able to obtain a very flat frequency characteristic and to use this number of stages without encountering trouble due to feed back, oscillations, etc. The first and third stages use UX-210 Radiotrons and the second stage uses a UX-841 Radiotron. Grid bias voltage is supplied by dry batteries and plate voltage is supplied by a 500-volt tap on the 1,000-volt generator. The plate circuit of each tube is designed with a filter arrangement which prevents objectionable hum from the generator being heard in the loudspeakers. Jacks are provided for reading the plate current of each tube and for reading the bias voltage. The gain control mentioned above regulates the volume to any desired level. At the left of the gain control there is located a jack marked "Phonograph Pick-up" which permits the use of non-synchronous equipment in conjunction with the regular amplifying system.

Power Amplifier Panel

Upon emerging from the voltage amplifier, the signal enters the power amplifier. The power amplifier panel comprises two separate panels, the upper one having a screened opening which allows ventilation for the two rows of tubes mounted behind the lower panel. These consist of ten UV-845 Radiotrons. The amplifier is of the push-pull type.

The lower panel contains two plate current meters, a meter for measuring the speaker current and two rheostat dials for controlling the plate current.

A monitoring loudspeaker to check the sound may be plugged into a jack located to the left of the speaker current meter.

Power Control Panel

On this panel the power controls are mounted. They comprise:

A motor-generator "Start-Stop" switch with an indicating lamp beside it.

A tumbler switch (at the lower right of the panel) which applies the voltage to the filaments, grids, and plates of the tubes.

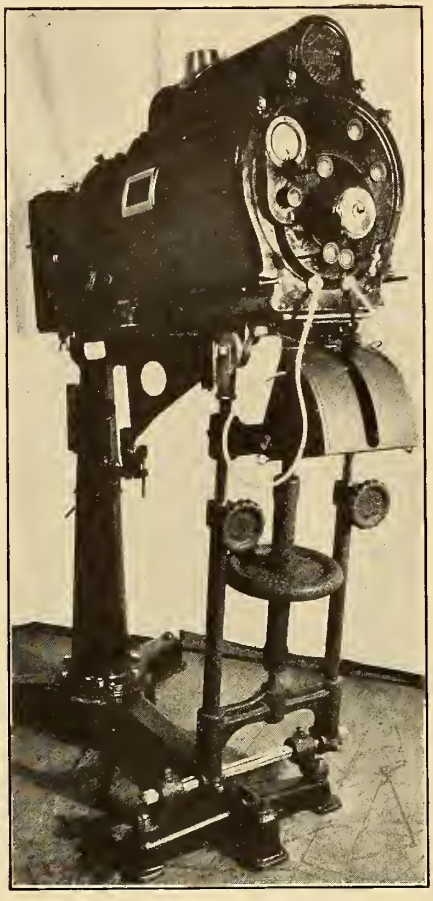
Four jacks are provided on the panel. The plate voltages of the power amplifier, the grid voltage of the power amplifier, and the filament voltage of all tubes may be determined by plugging a meter into the respective jacks.

Three meters are mounted in the center of the panel. An ammeter with a zero center is on the right and indicates the charge or discharge current in the battery circuit. The other two meters are for testing purposes and are used in conjunction with the jacks on all panels when checking the various circuits.

Loudspeaker Sectionalizing Panel

This panel is located at the bottom of one of the amplifier racks. The other amplifier rack is supplied with a blank panel in this position. On the panel are mounted the output switches which connect the loudspeaker to the amplifiers. There is provision for cutting off each pair of loudspeakers and for cutting off the entire group. There is also provision for trans-

(*Continued on page* 22)



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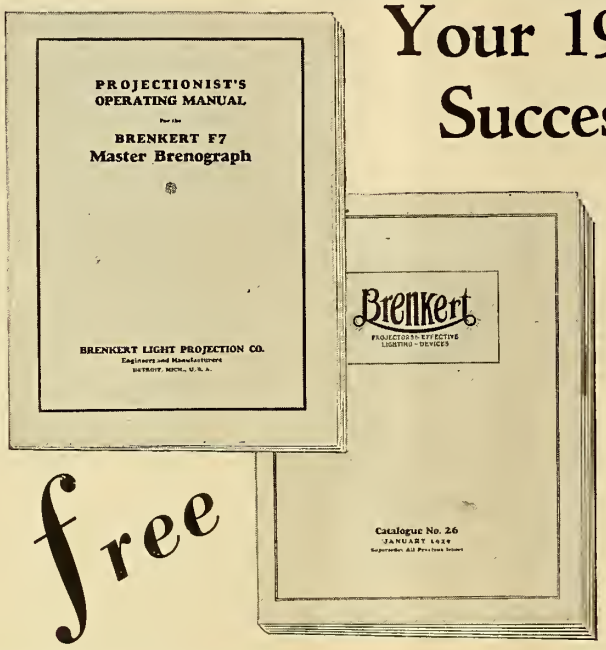
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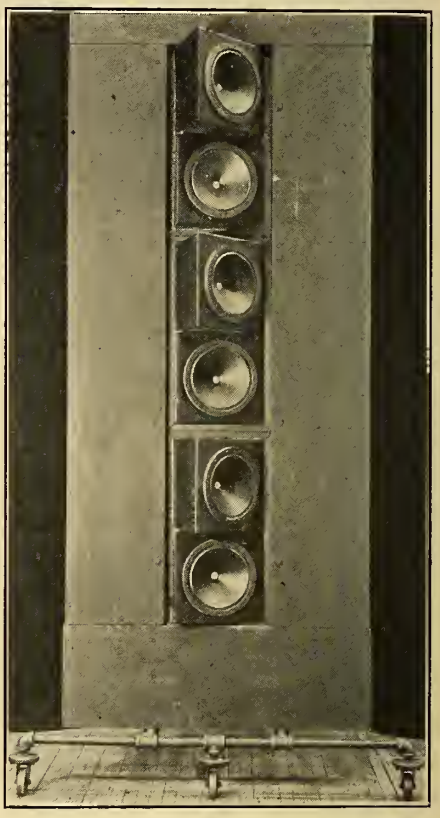
Mfrs. of Portable, Manual, Remote Control Switchboards

RCA Photophone System Technical Data

(*Continued from page* 21)

ferring the entire group of loudspeakers from one amplifier rack to the other.

In case of trouble with the amplifier which is in operation when the motor generator set for the spare amplifier is started, the output signal is switched to the spare amplifier and the input is switched by opening the two gang switches on the regular amplifier and closing the two gang switches on the spare amplifier. This operation takes a very short time so that the independent



Six moving-coil, cone speakers mounted on a rack which can be moved on rollers. Notice angular placement of speakers which are mounted alternately at 45° and 15° to front of rack. An exclusive RCA feature.

system may be placed in operation almost before the audience is aware that trouble exists.

Motor Generator Set

All power for operating the Type "A" equipment is supplied by a 4-unit motor generator set which is usually installed in the regular generator room of the theatre. This unit consists of a 4-horsepower driving motor and the following generators:

1—A 250 volt generator which supplies field current for the other generators, bias voltage for the power tubes and field current for the loudspeakers.

2—A 15 volt generator which supplies current for lighting the filament of all tubes, pilot lights and photo-cell exciter lamps.

3—A 1,000 volt machine which supplies plate current for all tubes and the polarizing voltage for the photo-electric cells.

This machine has two commutators so that it also supplies current at 500 volts potential.

Storage Batteries

Each Type "A" amplifier is supplied with a 12-volt storage battery of low capacity. These batteries are floated across the 15-volt generator and are used normally as filters for taking out generator ripple. Only in extreme emergencies are they used as an actual source of power.

Visual Signal System

In order that the volume of sound from the loudspeakers may be kept at the proper level, RCA Photophone installs a visual signal system in the projection room, and this system is controlled by push buttons located at some suitable point in the theatre. Two types of signal stations are supplied. One of these has lamps which are lighted when the button is pressed and thus show the operator what change is desired. A buzzer which is included as a part of the signal station attracts the operator's attention. The second system employs a standard 3-drop annunciator. When a button is pressed, one drop falls and a buzzer attracts the operator's attention. The drop remains down until the operator resets it.

Projection Room Monitor

With each installation RCA Photophone installs a projection room monitor. This is a standard loudspeaker, connected to the output of the amplifier so that the operator may hear what is being reproduced by the auditorium loudspeaker. This monitor is not intended to be used for controlling volume, but is useful in determining whether or not the equipment is operating properly, and in testing.

Type "B" Amplifier

In the Type "B" equipment one amplifier rack is used, consisting of the following panels:

An input and voltage amplifier panel.
2 power amplifier panels.
A power control panel.

Input and Voltage Amplifier Panels

The input and voltage amplifier panel is made as a single unit and is quite similar to the corresponding two panels of the Type "A" amplifier. Duplicate controls on the panel are provided for two projectors. They consist of two exciter lamp rheostats with corresponding meter jacks, two projector control switches with corresponding pilot lamps to indicate which projector is connected to the amplifier, a single test meter with cord extension, and jacks for reading plate current and bias voltage. With one exception the voltage amplifier is similar to the one used in Type "A" amplifier. The type "B" voltage amplifier has the gain control following the second stage. The first and third stages are UX-210 Radiotrons and the second stage used a UX-841 Radiotron.

Power Amplifier Panels

The two power amplifier panels are similar in construction and operation. Each consists of four UV-845 Radiotrons connected push-pull parallel. On the panel are mounted two plate current meters which indicate the plate current in the front and back row of tubes respectively, two potentiometers for adjusting the bias voltage to obtain the proper plate current reading, a power switch, a monitoring loudspeaker jack and a loudspeaker switch. Each power amplifier operates a bank of six RCA Photophone loudspeakers.

Power Control Panel

The power control panel consists of a motor-generator "Star-Stop" switch with a pilot light to connect when the motor-generator set is in operation, a rheostat to control the generator voltages and jacks appropriately marked for filament, bias and plate voltage readings.

Speaker Sectionalizing Panel

On the side of the amplifier rack is located a small loudspeaker sectionalizing switch panel. Six switches are mounted on this panel and are used for controlling the loudspeakers in groups of two.

Auxiliary Equipment

The motor-generator set, storage batteries, projection room monitor and visual signal system which are used with Type "B" (MG) amplifier are the same as those used with Type "A" amplifier.

Types "B" (SPU) "C" and "D" Amplifiers

As previously stated, these amplifiers are made up of similar parts and differ only in the number of units in use. The essential parts of each type are the input control panel, the voltage amplifier unit, the power amplifier unit, the battery equipment.

Input Control Panel

The input control panel used in RCA

(*Continued on page 26*)



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Novel Camera Photographs Air Streams and Bullets in Flight

MOTION pictures taken at the rate of 20,000 a second have been exhibited by Professor Alexander Klemin of New York University before a meeting of the Optical Society of America.

They represented, among other things, an airplane propeller in operation at a rate of fifty-seven revolutions a second. As it was shown, it moved at a speed little faster than that of a revolving door, so much had the camera slowed down the motion.

A stream of air was shown moving against various objects, and the effects of the objects on the air current could be plainly noted. At the high speed at which the pictures were taken differences in refraction between the cooler and warmer portions of the air were sufficient to produce shadows on the film which showed distinctly in the presentation.

Air Streams Pictured

The importance of the high-speed pictures was demonstrated by the comparison of various types of airplane wings, shown with air streams moving against them. In some cases it could be seen that the air encountered great resistance, while in others it flowed smoothly over the surface of the wing, meeting very little interruption.

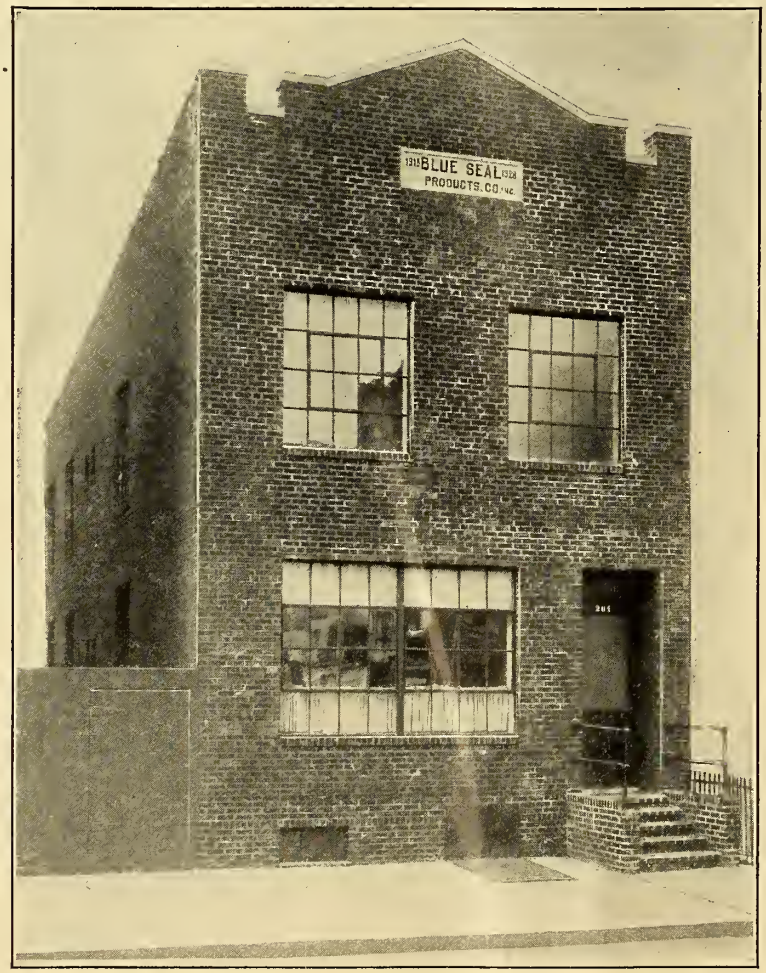
Pictures of the revolving propeller of an autogyro were flashed on the screen and at the end of the film came the highest speed photos. Pictures of a vacuum bulb being shattered by a bullet from a toy gun were shown and repeated several times. The last two times showed the bullet proceeding very slowly into the bulb. The very last sequence showed the shattered pieces of the bulb remain almost stationary in midair after the bullet had passed through. They dropped at such an extremely slow rate that their fall was hardly perceptible.

Vibrating Spark Employed

The camera used in making the pictures was similar to an ordinary one except that there was no shutter used. Instead a spark, vibrating with high frequency, was employed.

The donation of a medal to be given every two years for distinguished work in optics was announced at the meeting. The medal is the gift of Dr. Herbert E. Ives, former President of the Optical Society.

The human eye can distinguish upward of 2,000,000 colors, according to an estimate by George B. Welch, Assistant Instructor in Physics at Cornell University, made before the American Physical Society at a meeting held at Columbia University.



New home of Blue Seal Products Co., Inc., in Brooklyn, N. Y.

Robot Operates Entire N. Y. Power Plant

AN instance of how the robot does its deadly work is in the case of the New York Edison Company. All human service ended the other day when an electric distribution station was put into service without a human being within the walls of the building.

This station is designed ultimately to supply the needs of 300,000 families. It is one of the largest electric distribution stations in the world and is being operated and controlled from another station three miles away.

Automatic Check on Work

The absent operator, in control of the robots in the station, not only knows how much work is being done but he is informed at all times as to conditions in the remote station. He manipulates the manless machinery, keeps in close touch with it and he has no back chat from the robots working day and night in the strangely deserted building.

Should prowlers or burglars break into the station the operator will immediately be aware of it at his safe distance. What would happen to such daring intruders is terrible to contemplate.

A Robot Policeman

Probably a robot policeman would emerge from some dim hidden closet, seize the miscreant in a vise-like steel hand, pull him across a chilled steel knee and spank him with about three thousand volts of electricity, then arise, whirl the unfortunate victim three times around his squared and dial-faced head and hurl him through a window where he might ponder about comparative safety of dealing with a flesh-and-blood cop.

* * *

To the men who have been thrown out of work there is no humor in the situation. The efficiency and expediency of the mechanical man system does not arouse any feelings of awe and admiration for the ingenuity of the human brain. He sees only disemployment and a weary task of seeking a new job and trying to keep his family fed.

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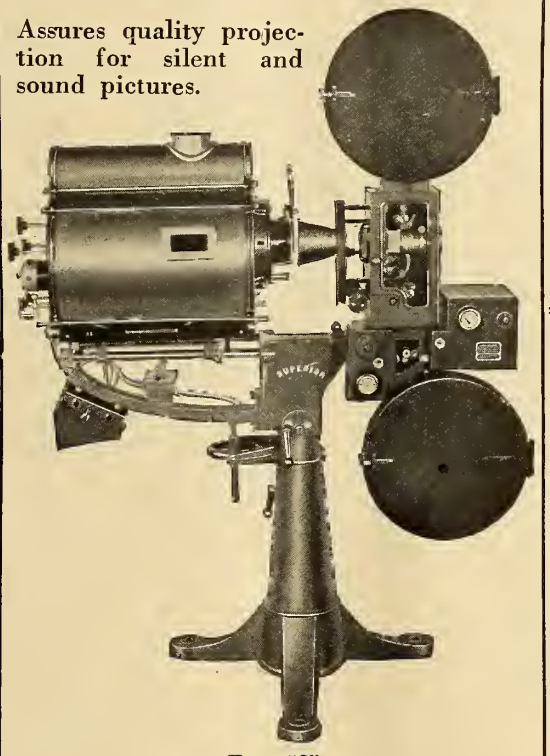
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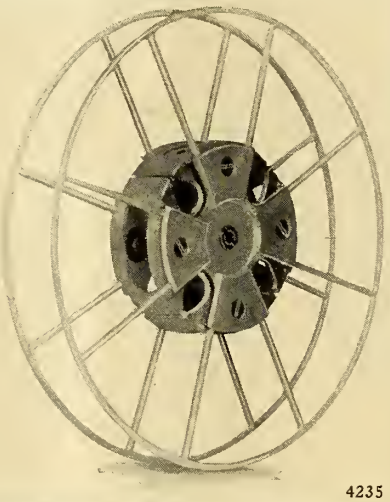
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RCA Technical Data

(*Continued from page* 23)

Photophone equipments Type "B" (SPU), "C" and "D" contains a change-over potentiometer, a volume control, a volume indicating meter, rheostat for controlling the photo-cell exciter lamp current and meters for reading the photo-cell exciter lamp current. The sound change-over consists of a specially made potentiometer with the mid-tap. The output of one projector is connected across each half of this potentiometer with the mid-tap common. In fading from one projector to the other all that is necessary is to rotate the potentiometer from one extreme position to the other, thus switching the output of one projector to the other.

The volume control, while located on the input control panel physically, actually is connected as a part of the voltage amplifier unit. This volume control consists of a specially built variable rheostat which is connected across the output of the second stage of the amplifier. The volume is controlled by varying the amount of resistance connected across the circuit. Since the resistance is non.-inductive, the volume is controlled without affecting the quality of reproduction. The volume indicating meter is an instrument which is connected across the output of the voltage amplifier unit and the scale reading indicates the actual output of the amplifier. The photo-cell lamp current rheostats are resistors placed in the line to limit the current drawn by the lamp.

Power Amplifier Unit

Each power amplifier unit consists of a single stage of two UX-250 Radiotrons operating push-pull. Filament current is supplied by the low voltage winding of a power transformer and plate voltages are supplied by a full wave rectifier utilizing two UX-281 Radiotrons. The output of the power amplifier unit is matched to four 12-inch dynamic cone loudspeakers.

The field current for these loudspeakers is supplied by a copper oxide rectifier which is fed from a separate winding on the power amplifier. These units are built with a filter system which effectively prevents any hum in the loudspeakers. Each power amplifier is designed to operate at 100 volts and the line voltage is reduced to this value by means of a suitable resistor mounted in the power amplifier control panel. This control panel also contains a meter which indicates line voltage, a separate line switch for each power amplifier and a monitor jack for each power amplifier. These last mentioned jacks are provided so that the monitoring loudspeaker may be connected across the output of any particular amplifier to check up on the quality of reproduction.

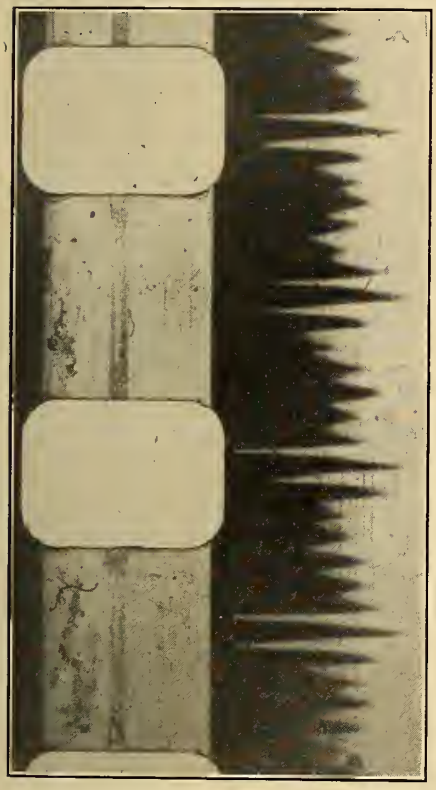
Voltage Amplifier Unit

The voltage amplifier unit used in RCA Photophone equipments Type "B" (SPU), "C" and "D" is a 3-stage transformer coupled push-pull amplifier employing six UX-210 Radiotrons. Filament voltage is supplied by a storage battery and the plate voltage is supplied by standard heavy duty radio "B" batteries, at 133 volts potential. These "B" batteries are located inside the amplifier within a metal cabinet. The out-

put of the voltage amplifier unit is connected to the power amplifier unit through the voltage amplifier control panel. This panel contains a test meter and jacks for measuring the various voltages. On the Types "B' (SPU) and "C" this panel also contains switching arrangements for shifting from one voltage amplifier unit to the other. This panel also contains a switch for turning the voltage amplifier on and off.

Battery Charging Equipment

The storage batteries are supplied in duplicate, one set to be charged while the other is being used. Where there is alternating current supply available a Tungar or Rectigon charger will be used for charging these batteries. Where direct current



Showing RCA sound track, which is known as the "saw-tooth" track. In this picture the track is magnified many times

supply is available a motor-generator set will be supplied. This unit will be equipped with a rheostat for controlling the charging rate, a voltmeter for indicating the voltage output and an ammeter to show the actual charging rate. There will also be included a reverse current relay to prevent the discharge of the batteries through the generator in case the motor-generator set is shut down.

Power Supply

Where 110-volt, 60-cycle alternating current power is available this line will be run direct to the amplifier through suitable fuses. If only direct current supply is available, converting equipment will be installed. This convertor is a standard direct-to-alternating-current machine with the exception that it has a special winding whereby, with an input of 125 volts direct current, the output is approximately 125 volts alternating current. For the larger equipment two of these convertors are installed, one to be used as standby equipment.

Projector Motors

RCA Photophone projectors are supplied with two types of motors. Likewise standard projectors which are equipped with RCA Photophone sound attachments are fitted with these motors. For direct current drive, a speed-regulated motor is used. This motor is installed with a set of resistors in the field circuit. Inside the motor itself there is a governor which is set by means of a dial on the end of the motor.

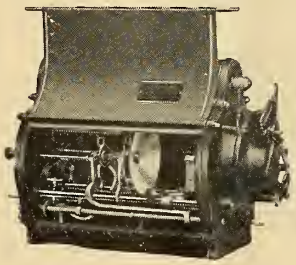
When the motor is running this governor operates in a manner similar to the standard flyball governor. There is a contactor which shorts out a portion of the field resistance when the speed rises above the desired value. This causes the motor to slow down, thus opening the contact. As soon as the contact is opened the increased field resistance causes the motor to increase its speed and the operation is repeated. The amount of resistance in the field circuit is controlled by a selector switch for high and low speeds and intermediate speeds are obtained by changing the adjusting of the governor and causing it to make contact at different speeds. (The design of the governing mechanism is such that the contactor operates before there is a perceptible change in the speed of the motor, thus maintaining constant speed.)

For alternating current installations the projectors are driven by synchronous motors in order to obtain absolutely constant speed for sound reproduction.



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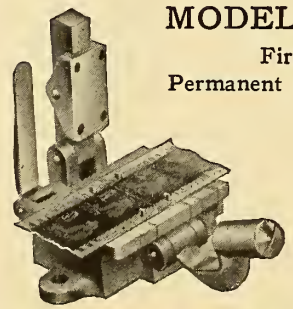
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Motor Control Box

(*Continued from page 7*)

plays the same part electrically that a rubber band, spring, or other elastic member does mechanically An alternating current is nothing but a back-and-forth movement of electricity in a circuit; and, therefore, by using a circuit consisting of a choke coil and a condenser, it is possible to create resonance effects, such as were just mentioned. Fundamentally, that is all there is to a "tuned" circuit.

In providing speed control for the motor, the first thing necessary is to have some means by which the motor can, so to speak, signal to the control box to show at what speed it is running. This is done very effectively by simply building into the motor a small A.C. generator, on the same shaft and within the same housing. This generator produces alternating current whenever the motor is running, of course, and the frequency of this alternating current will always be exactly proportional to the speed of the motor at each moment. Thus the A.C. generator acts as a pilot or speed indicator.

When the motor is running at the standard speed of 1200 r.p.m., the generator is producing alternating current at a frequency of 720 cycles per second; below 1200 r.p.m. of the motor, the generator frequency is below 720 cycles per second, and vice versa.

THE critical frequency of the tuned circuit in the motor control box is also 720 cycles per second—that is, it will pass A.C. at this frequency but not at any other frequency—and right there lies the key to the whole action of this apparatus.

During the period just after power has been put on the motor, when it is picking up speed, the generator frequency will, of course, be below 720 cycles per second; therefore no current will pass through the tuned circuit and the motor is free to speed up in the ordinary manner. But just as the motor begins to hit 1200 r.p.m., the generator also comes up to 720 cycles per second, and then current passes through the tuned circuit, which snaps into action and affects the control circuit of the motor in such a way as to prevent any further increase in speed. This action will now be explained in more detail.

The motor used on D.C. supply is a compound wound motor of the regular type, except that in addition to the usual shunt and series windings it has a special speed regulating winding, the current for which is supplied from the motor control box. As is well known, the speed of a D.C. motor is increased when the field current is weakened and decreased when it is strengthened. This is taken advantage of as the means for regulating the speed of the motor. The field winding for the pilot generator is supplied with current from the mains.

In the DC. control box are three vacuum tubes (see Fig. 1). Two of these act as rectifier tubes, taking the pilot generator current and changing it to D.C. for supplying the regulating field on the motor which was just mentioned. The amount of current these tubes will pass,

however, depends on their grid bias; this is controlled by the third tube, which in turn is operated as an amplifier by the tuned circuit. At speeds below 1200 r.p.m. the grids of the rectifier tubes are negatively biased and therefore the rectified current through the motor regulating field is small, permitting it to speed up at 1200 r.p.m., the tuned circuit functions and the negative grid bias of the rectifier tubes is in consequence decreased, causing the regulating field to strengthen so that no further rise in speed can take place. If the speed tends to go above 1200 r.p.m. this effect becomes still more pronounced.

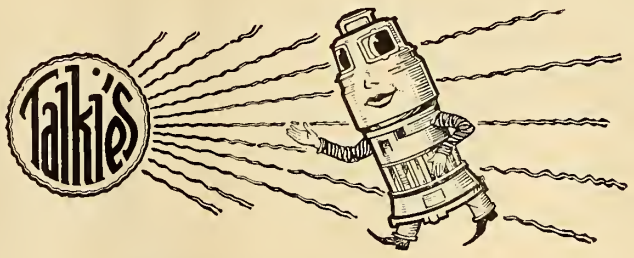
The motor control box circuit functions in this manner when the regulating switch is in the "Reg." position. When it is in the "Var." position, the tuned circuit and vacuum tubes do not function; the regulating field winding is supplied with D.C. from the mains through a rheostat connected with the control knob, which therefore regulates the speed as desired when it is turned.

The motor used on A.C. supply is of the repulsion type. Such motors have two windings: the stator winding, which is fixed and receives power from the mains, and the rotor winding, which is on the revolving part of the motor and is not connected with the power supply. This winding is connected to a commutator which has two brushes. If these brushes be connected to a circuit so that current can flow from one to the other, then the speed of the motor will depend on the amount of this current; and so, by regulating the latter one can regulate the speed of the motor.

The A.C. control box contains four vacuum tubes (see Fig. 2). Of these, one is used to supply rectified current for the field of the pilot alternator. Two more tubes act as rectifiers supplying current to one winding of a special choke coil. This coil has a second winding placed in the circuit which controls the motor brushes. When the current through the first winding is large, the choking action of this coil is not very pronounced; therefore a relatively large rotor current can pass and the motor can speed up.

As the current through the first winding is decreased, the choking action of the coil is increased and hence the motor speed begins to be limited. Therefore the motor

(Continued on next page)



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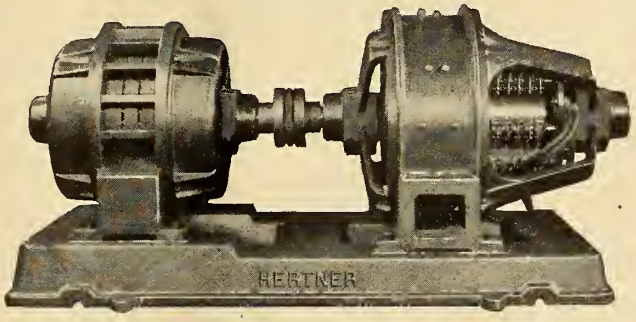
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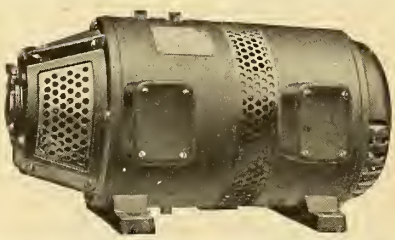
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Some Characteristics of Electrical Pick-ups

CONSIDERABLE interest has been shown recently in the possibilities of electrical reproduction of records, especially by using the amplifier and reproducer of a radio receiver or a separate amplifier for the particular purpose in conjunction with a turntable and a pick-up of the magnetic type. Since sound pictures now enjoy such a vogue, the progressive projectionist will welcome information on this topic.

The whole scheme of electrical reproduction may be divided into a number of different phases starting from the record, which we are forced to accept as it is, passing on to the pick-up, then to the audio frequency amplifier and finishing at the reproducer. Several excellent articles have appeared in various publications concerning amplifiers, and since it is possible, with comparatively little trouble, to make a satisfactory amplifier as long as one does not want excessive overall amplification, this phase of the subject calls for very little discussion. Present-day reproducers are by no means perfect, but the modern type of cone and dynamic speakers are capable of very satisfactory results.

Duties of the Pick-Up

This now leaves us with the consideration of the pick-up, the duties of which may be briefly stated as follows: To convert in some manner the movements of a needle in a groove of a record into variations of electrical potential so that the

Motor Control Box

(*Continued from page 29*)

speed can be controlled by regulating the output of the rectifier tubes. Their output depends on the bias supplied to the grids, and this, in turn, is controlled by the fourth vacuum tube which is operated as an amplifier by the tuned circuit. At speeds below 1200 r.p.m. the grids of the two rectifier tubes have very little negative bias and these tubes therefore pass a relatively large current through the first winding of the choke coil. Therefore a large rotor current circulates, allowing the motor to speed up.

At 1200 r.p.m. the tuned circuit functions, causing the negative bias of the rectifier tubes to be increased; this decreases their output and causes the choke coil to cut down the rotor current so that no further speed increase can take place. If the speed tends to go above 1200 r.p.m., this effect becomes still more pronounced.

The A.C. motor control box functions in this manner when the regulating switch is in the "Reg." position. When it is in the "Var." position the tuned circuit is opened and does not function; the vacuum tubes continue in action, however, and the fourth, or amplifier, tube instead of being operated from the tuned circuit, is controlled by means of a resistance connected to the control knob, which therefore regulates the speed as desired when it is turned.

variations of electrical potential are equivalent to the ripples of the record.

Of all the various methods of conversion the moving-iron electromagnetic type of pick-up seems to be the most popular. Whatever method of conversion is used, certain mechanical considerations must be taken into account.

(a) The needle must follow the record groove exactly.

(b) The speed of the record should be constant.

(c) The effective weight of the pick-up must be great enough to satisfy conditions (1) but not enough to cause undue wear on the record.

(d) Damping on each side of the position of rest should be equal for equal amplitudes.

(e) Mechanical resonances of the needle and its attachments must be so minimized as to have no effect on the output of the pick-up.

Important Considerations

These conditions may seem self-evident but they are extremely important and are all quite closely connected with each other. For instance, if the damping of the needle is made very high (in order to eliminate unwanted resonance in the moving-iron system) then the effective weight of the pick-up must be made fairly large in order to keep the needle in the groove. This, in turn, will lead to excessive wear. On the other hand, if the effective weight of the pick-up is not made greater than that of a conventional sound-box, and if high damping is used, the needle will probably not follow the groove when it has a fairly large amplitude of movement but will have a tendency to jump the groove or scratch the record. The term "effective weight" has been used to mean the weight on the needle. An extra heavy pick-up, of course, may be counterbalanced by weights on springs so that the effective weight can be made variable.

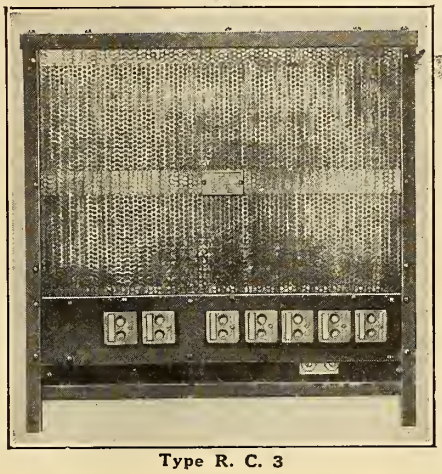
Probably the most important problem in the consideration of the electrical characteristics of a pick-up is the elimination of resonance points. In a damped-reed type of pick-up the natural frequency of the reed should be made high so as to obviate trouble due to overtones. A simple reed fixed at one end will be, of itself, very stiff without artificial damping. In the moving-iron system the iron armature is usually pivoted so that it is quite free to move in one plane. Damping is then applied, usually at the end not carrying the needle.

It is desirable in conjunction with most commercial pick-ups partially to suppress the higher frequencies in order to reduce surface noise or scratching. This is usually accomplished by connecting a choke and condenser in series across the output of the pick-up. A shunt circuit of this description should be tuned to around 4,000 to 4,500 cycles. This suppression of high frequencies is at the cost of some overtones, especially in speech, but gives a most pleasing result, especially with musical numbers.

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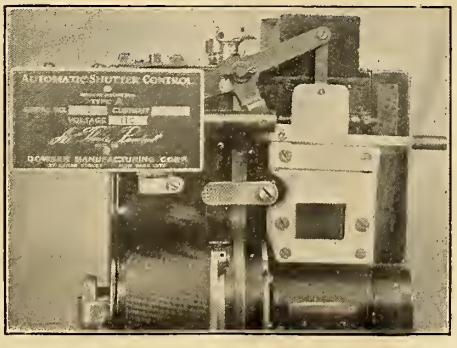
Contracting Electrical Engineers—Moving Picture Theatre Electrical Specialists

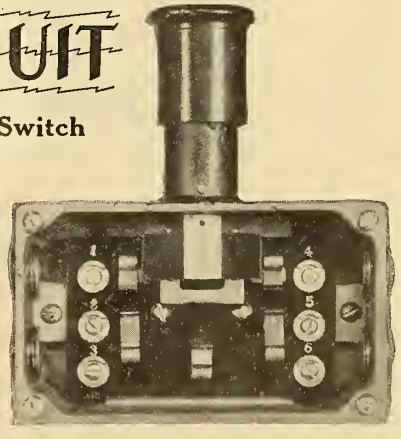
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Sound Big in Canada

"Sound pictures have proven very popular at every point where they have been introduced in Canada," said Mr. V. Armand, projection supervisor for Canadian Famous-Lasky Theatres in Western Canada and proprietor of the Canadian Theatre Supply Co., in Winnipeg, on the occasion of a recent visit to New York.

Armand cited the recent improvements to the Capitol Theatre in Edmonton, Alb., Canada, as typocal of many of Canada's finest theatres. The Capitol sound installation cost $25,000, and an extra $10,000 was expended for projection equipment. Armand is quite proud of the sound installation work now in progress in Canada and he says that Canadian theatres are not one whit behind those in the United States in the matter of general theatre appointments and projection equipment in particular.

With regard to the theatre equipment business, Armand is of the opinion that the coming of sound pictures demands that a dealer make certain changes in stock, personnel and methods in order to keep apace of the rapid developments.

In the Mail Bag

(*Continued from page* 18)

son, Gaumont, Pathe and Simplex machines in Germany, France, England and in this country. The reason why the intermittent movement more popularly known is called the "Geneva movement" and sometimes the "Maltese Cross movement" is not because this movement was first used in Geneva or on the island of Malta, but because it resembles the star in particular, the Geneva Cross, (the so-called Red Cross) which was adopted at the Convention of Geneva in 1864 and also because it resembles the eight-pointed Maltese Cross of the Order of the Knights of Malta.

Besides the Geneva or Maltese Cross movements there are several more: the dog movement; the pin, or claw, movement, which is used for cameras and are not as durable as either the dog or Maltese movements. Then there is the cam and claw movement; the Diamond Cam movement, and the friction grip movement.

Correct Film Speed

Under the heading "Intermittent" there appeared the explanation that it was the device that moved the film normally at 16 frames per second. But Mr. Hill states that this is very indefinite. I cannot agree with Mr. Hill, as I consider this explanation correct. A picture projected at 60 f.p.m. is natural looking, the figures on the screen will move in an absolutely lifelike manner; whereas a picture projected at 80 f.p.m. means that 22 pictures will be exposed each second, which I consider an outrage on the efforts of producer, exhibitor and projectionist, to say nothing of the wear on the machine.

If Mr. Hill's viewpoint in this matter is typical of all the boys, is it any wonder that the picture theatre patrons, particularly in the big cities, come out of theatres with their eyes popping out of their heads from the strain. Eighty and 90 f.p.m. projection hardly allows the cash customers to read the titles, and one simply must suppose that this greatly advanced speed is but another concession to the big shots confronted with the problem of filling and emptying theatres as quickly as possible.

And that, according to Mr. Baumer, is that!

Buy Nuprocess Color Rights for American Company

Hans von Fraunhofer, president of United Film Industries, Inc., of New York, who will be remembered for his highly interesting article on colored film in these columns, is reported to have closed a contract for the purchase of world rights in Nuprocess Color photography for $3,000,000.

Commenting on his acquisition of Nuprocess rights, Mr. Fraunhofer said:

"Nuprocess will revolutionize the cinematograph. By means of this process it will be possible to take photographs in natural colors which will give splendid results and which will eliminate many difficulties which heretofore have barred the way to the realization of perfection in this art."

Mr. Fraunhofer, now on his way to this country from England, will shortly contribute to these columns the second of a series of articles on color film.

Vacuum Tube Elements

(*Continued from page* 15)

electrons back to the filament and thereby causes a great reduction in the flow to the plate. This is the condition under which vacuum tubes are operated in standard practice, and is the effect pictured in Fig. 3.

Vacuum Tube Amplification

The amplification obtained by means of the vacuum tube is not a power nor even a voltage amplification. It is a *voltage*

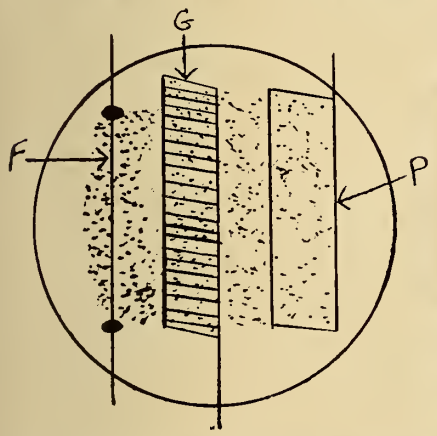


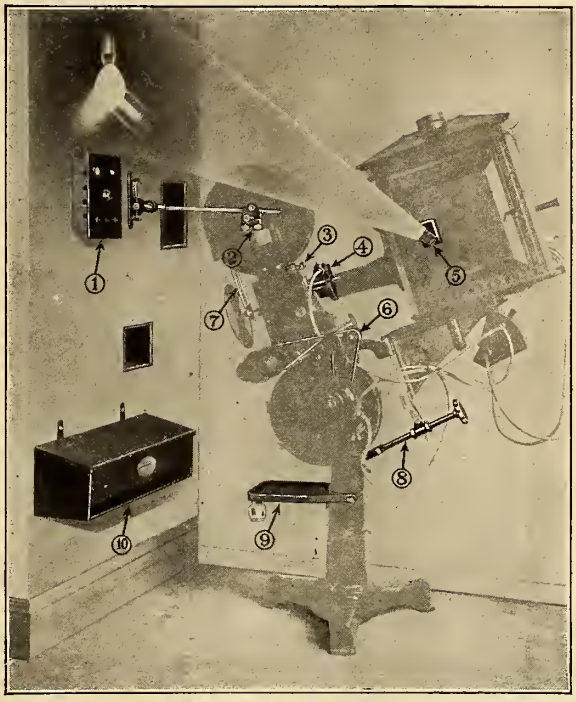
Fig. 3. Showing effect of a negative charge on the grid. It will be seen how relatively few electrons reach the plate

change amplification, as it is the small *changes* in the grid voltage that produce large changes in the plate-filament current.

Referring back to Fig. 1, the valve (D), is analogous to a grid, as it controls the flow of water (electrons); the source of the water may be imagined to be the filament, and the plate might be represented by a water wheel to receive the energy at the end of the trough. The trough (T^1) and the coupling lever system (BCB), may be likened to the original energy and coupling device between tubes of a standard amplifier.

A standard amplifier will be described in detail in an article in an early issue of THE MOTION PICTURE PROJECTIONIST.

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Units of Electrical Transmission

By J. W. HORTON, General Radio Co.

THE communication engineer, although he deals generally with very small amounts of energy, is frequently concerned with ratios of energy having enormous magnitudes. The ratios between the rates of energy flowing in different parts of a communication system, if expressed numerically, may be quite as impressive as the figures used by the power engineer. As an example, the power delivered by an ordinary telephone transmitter is of the order of 0.01 watt. This may be used to control the output of a 100-kilowatt radio transmitter, in which case the ratio of the powers at the two ends of the system is ten million. Again it is quite possible for the energy delivered to its loud-speaker by a modern radio receiver to exceed the energy delivered by the antenna by one hundred million to one.

Because of the relations between the quantities involved the communication engineer finds it desirable in describing the efficiency of his apparatus to adopt a method differing markedly from that used by the power engineer. Until recently this method was to compare the performance of any piece of apparatus to that length of standard telephone cable which changed the amount of power delivered by the same ratio.

In making this comparison two factors must be taken into account, first the energy dissipation—or attenuation—within the apparatus, and second, the ability of the apparatus to receive and deliver energy across the junctions between it and associated circuits. To describe the performance of any apparatus, therefore, it is customary to consider the power which would be received by a given load circuit from a given generator circuit when they are connected directly together, and the power received when the apparatus in question is included between them.

In the case of a length of standard cable it was assumed that the generator and receiver circuits were both long lengths of similar cable so that the only loss due to introducing the reference length was the dissipation within the reference length.

One consequence of expressing performance in this way is that the over-all value for a system is computed by adding together the values expressing the performance of the several parts. This differs from the practice of the power engineer who multiplies together the percentage efficiencies of his components.

A Standardized Unit

The above method of expressing the transmission efficiency of a piece of apparatus as some function of the logarithm of a power ratio has two decided advantages for the communication engineer. In the first place it fits in conveniently with his transmission formulæ. In the second place, it is most convenient when used in connection with the sensation of loudness, which also follows a logarithmic law. This latter fact can be demonstrated by determining the amounts of energy required to give a series of sounds differing by apparently equal intensity intervals. If these amounts of energy are compared it will be found that successive values bear a fixed ratio to one another.

In spite of its convenient logarithmic character the "mile of standard cable" or "800-cycle mile" has certain disadvantages. First, it is associated with an arbitrarily selected physical cable and is significant only for currents having a frequency of 800 cycles. Second, it requires, when used in mathematical computations, the use of an arbitrary constant based on the physical cable. Because of these disadvantages an effort has been made to standardize a new unit which will be of greater simplicity.

It was originally intended that transmission units should be used in referring to the performance of apparatus, that is, to the gain or to the loss resulting when the apparatus was employed. Since, however, the unit is based on power ratios it is only natural that it has come to be used for expressing amounts of power. This is most frequently done by selecting, arbitrarily, some amount of power as a "reference level" and describing other amounts of power as being so many transmission units above or below this reference level. It must be emphasized that a power level expressed in this way can have no significance unless the reference power is specified. There may be as many reference points as there are systems for electrical communication. In telephone lines, for example, the standard output of a repeater is spoken of as "zero level" and the rate of energy low at other parts of the system is thus referred to this level. In high quality broadcast transmission a power level of 0.006 watts has been arbitrarily chosen as zero level. Thus when we say that an amplifier is capable of delivering a "plus 10 db level" we mean that it is capable of delivering 0.06 watts. The use of transmission units in describing power levels emphasizes the advantage of using a logarithmic unit in connection with such phenomena as hearing which itself follows a logarithmic law. The practice should, however, not be carried to the point where the reference power level is lost sight of.

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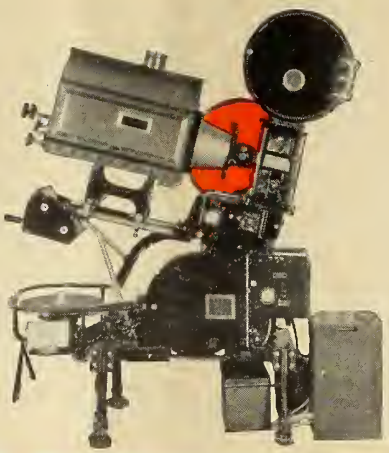
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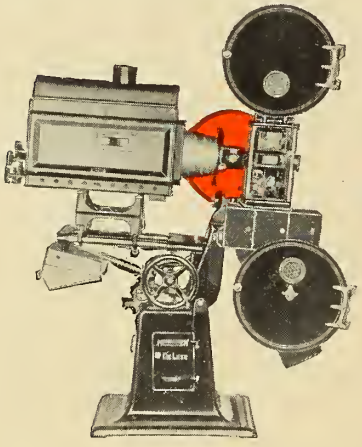
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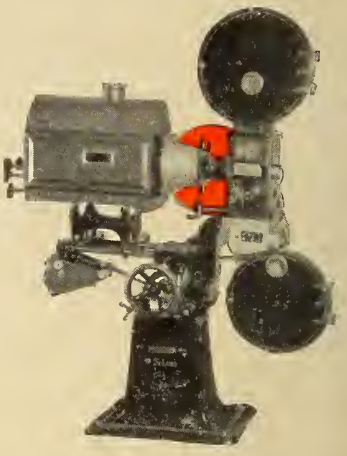
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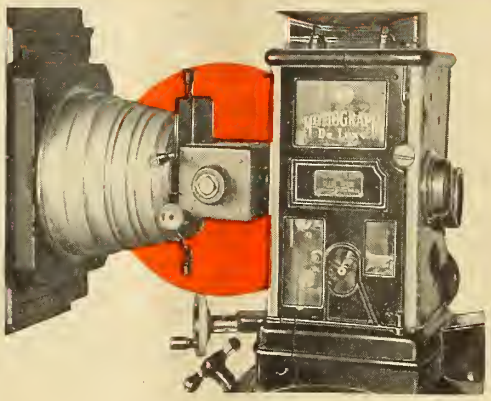
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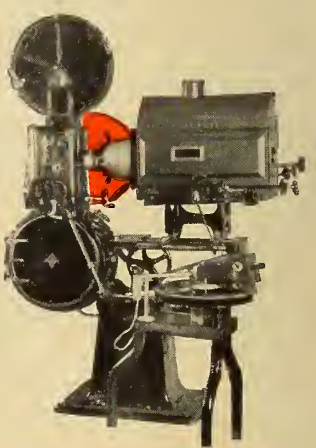
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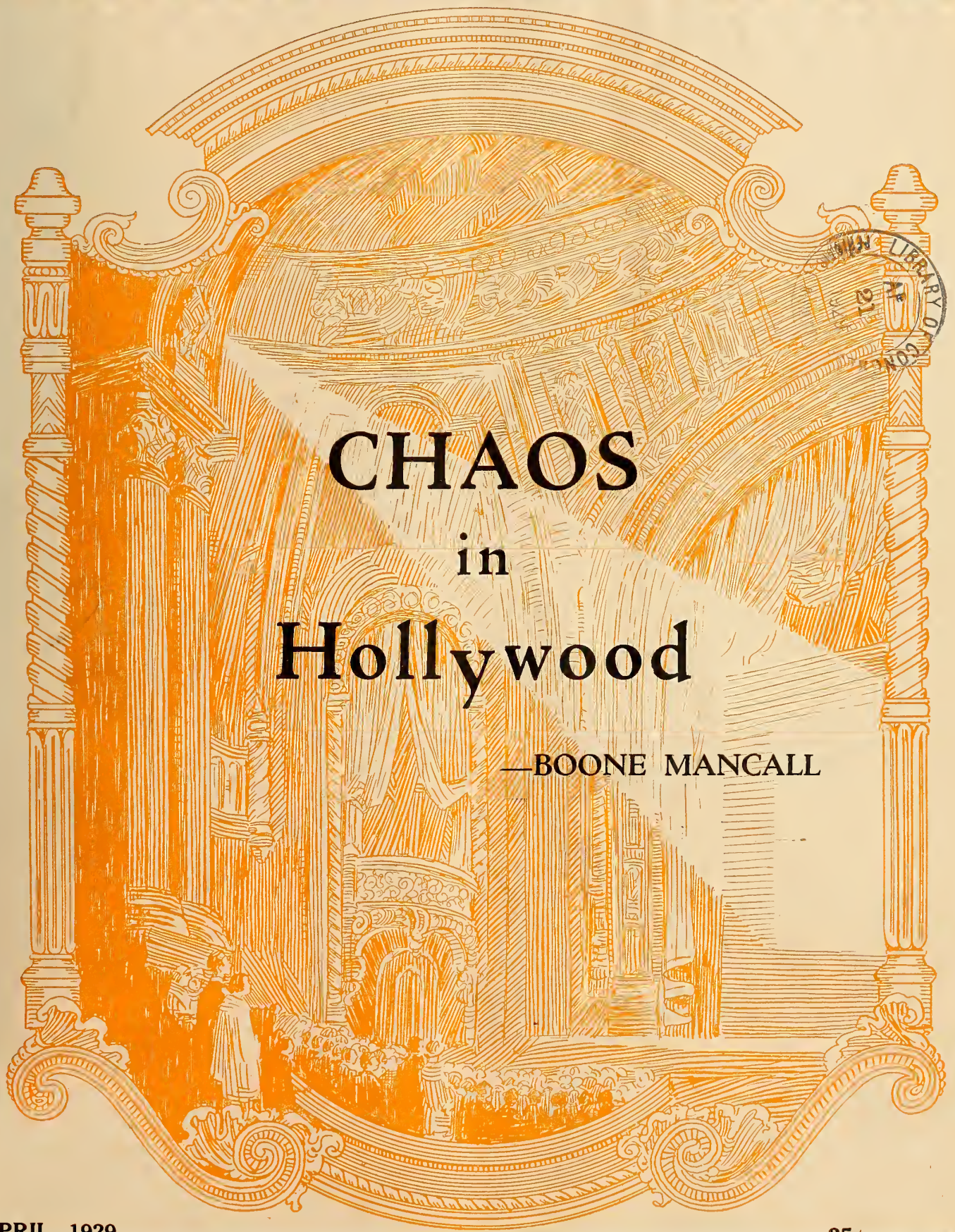
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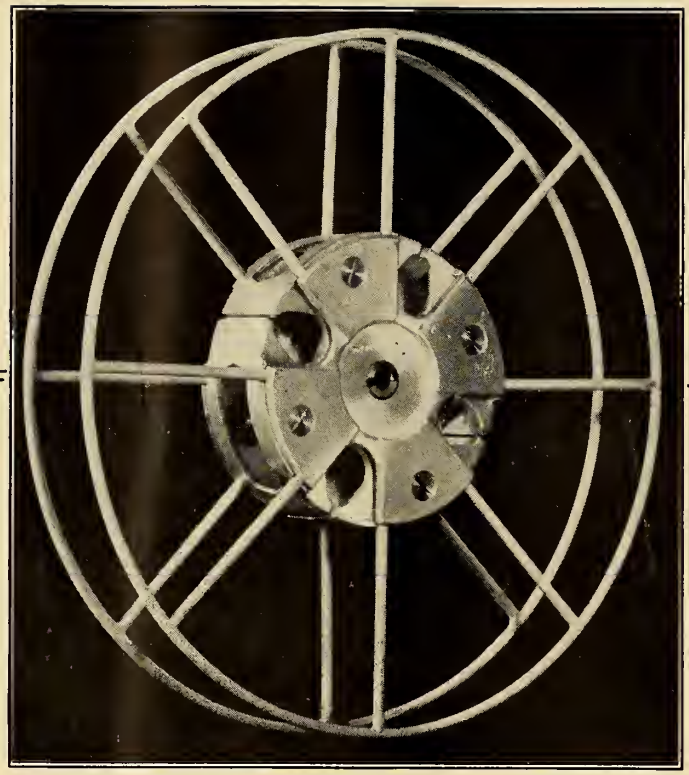
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ERPI Sound Press Sheet; 1550 U. S. Houses Wired

Electrical Research Products Co., Inc., are now issuing press sheets on Western Electric sound systems. The book contains advertising layouts, press stories and illustrations, with mats and cuts being supplied free by E. R. P. I.

The book contains samples of advertising now appearing in nationally-circulated magazines such as the Saturday Evening Post, Liberty, and others. The book is figured to be an aid to the exhibitor in stimulating interest in sound pictures.

Latest figures place the number of wired houses in the U. S. at 1,550.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of

THE MOTION PICTURE PROJECTIONIST,

published Monthly at New York, N. Y., for April 1, 1929.

STATE OF NEW YORK } ss.
COUNTY OF NEW YORK }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James J. Finn, who, having been duly sworn according to law, deposes and says that he is the Editor of THE MOTION PICTURE PROJECTIONIST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Mancall Publishing Corp., 45 West 45th St., New York City; Editor, James J. Finn, 45 West 45th St., New York City; Managing Editor, none; Business Manager, James J. Finn, 45 West 45th St., New York City.

2. That the owner is: Boone Mancall, 45 West 45th St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security bolders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security bolders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is . . . (This information is required from daily publications only.)

JAMES J. FINN,
Editor.

Sworn to and subscribed before me this 1st day of April, 1928.

NATHAN REIGROD.

[Seal] (My commission expires March 30, 1931.)

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7 OUTSTANDING ADVANTAGES *of the*

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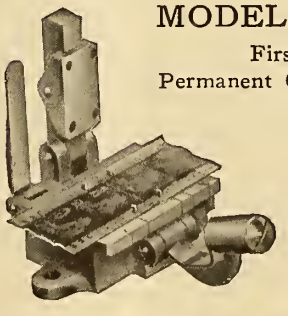
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Small wonder that this lens has received such an enthusiastic reception from operators everywhere, and that this lens is hailed as the most outstanding advance in projection optics in years.

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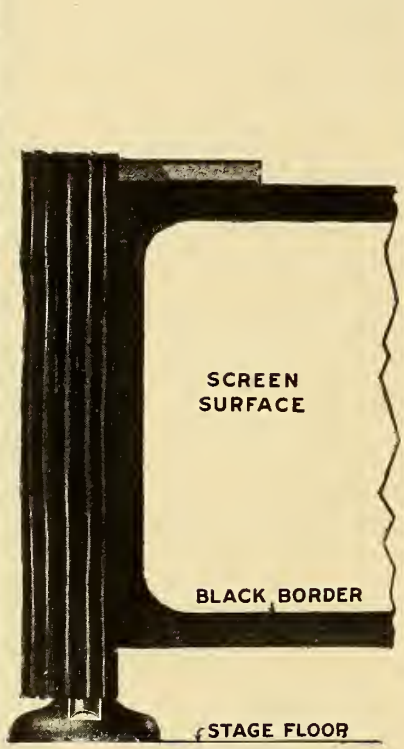
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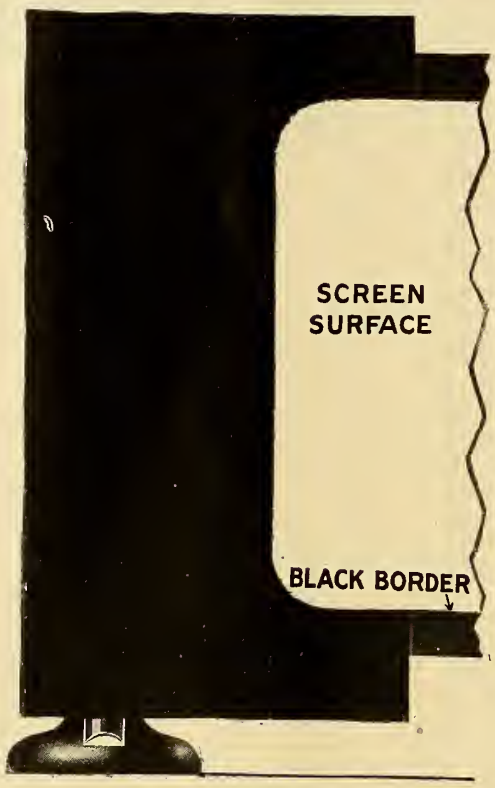
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Installation and Adjustment of W. E. Sound Systems

By HOWARD B. SANTEE
Electrical Research Products, Inc.

THAT there may be realized the full advantages which a Western Electric Sound-Projector System can bring to a theater, each installation is planned and directed individually by engineers of Electrical Research Products, Inc., the organization which provides the apparatus. Preceding the installation, engineers of that company conduct a detailed preliminary investigation to decide upon the exact apparatus, and to determine any changes that may be needed in the theater building. The equipment is installed under supervision of an engineer of the organization who in addition sees that whatever supplementary work was needed in the building has been carried out properly. As the work proceeds he sees that the equipment is so placed and so regulated as to give the best results, and as the various pieces of apparatus are made ready for use, he trains the projection-room employees in their operation. Finally the completed installation is kept at the highest standard of operation and maintenance through supervisory visits made at intervals by a field engineer, and routine maintenance work is directed by the organization's service group.

Although its need may not at first be fully apparent, the preliminary survey receives the most careful attention to insure that everything will be in readiness for the work of installation to progress smoothly, and that the apparatus best suited for the particular theater will be used. Acoustic characteristics of the stage and auditorium receive thorough study, upon which in many cases the success of the installation rests. Size and location of the stage are noted, for their bearing on placing of the horns and of the special screen needed.

Preliminary Survey Work

Where blueprints of the theater building are not available, the engineer must measure the dimensions himself and must prepare sketches showing the size and shape of the auditorium and the number and arrangement of the seats. He must also appraise the acoustic characteristics, discovering any sections where there is an echo, interference, noise from an extraneous source, or any other hindrance ot proper hearing. A final study of acoustic conditions is best made on completion of the installation, but data obtained during the preliminary survey give a useful basis for the installation work.

In the projection room the engineer notes the type and condition of the projection machines, the power supply and its regulation, the angle of projection. He sees whether there is room between the machines to allow convenient operation after installation of the sound apparatus, and whether there is a suitable space for the amplifier and the associated controls. In cases where the room is inadequate he decides upon the rearrangement or enlargement that is needed.

At the end of the study, the engineer's recommendations, along with the sketches and detailed information on which they are based, are submitted to the home office. There all the circumstances are examined again, and a report embodying a final set of recommendations is prepared.



Late Type Amplifier

Field Engineer in Charge

When details of the installation are fully determined, dates are assigned for shipping the apparatus and for the start of the installers' work, and the theater management is informed. The management is in addition notified at this time if architectural changes are needed in the projection room or elsewhere, so that they can be finished before the work of installation is commenced.

The entire work of installation is directed by a field engineer whose main function is to see that all parts of the work, and all supplementary work in preparing the theater, are so carried out that the completed system will operate at its full possibilities. He first establishes satisfactory contacts with the theater manager and staff, and with information obtained from them coordinates the work of installation, testing and rehearsal with circumstances necessary for operation of the theater during the preliminary period. Likewise he chooses an electrical contractor, if possible one already familiar with the wiring in the theater. Thus he insures that the work will proceed smoothly, and that everything will be ready for the scheduled opening.

Work Begins at Projectors

Most commonly the work starts at the projectors themselves. While these remain practically intact in other respects, on each the driving motor is replaced with one whose speed is regulated electrically. As these motors require from four to five seconds to come up to running speed, it is desirable to have them in place early, that the projectionists may become accustomed to them and so be able to give full attention to handling the records by the time sound programs are to be presented. Next the batteries are installed, with their switching panel and charging apparatus, and a motor-generator if that is to be used. The rack for the main amplifier is placed in position, and the units mounted upon it.

Next the fader is installed, and its auxiliary controls put in place and connected to it. Likewise the monitoring horn is mounted at a carefully chosen location in the operating booth, so that the projectionist will be able to hear the program clearly at all times and thus be prepared for the fader changes between the records. Usually the turntable and pick-up for disc

records are then installed on each machine and, for film records, the exciting lamp, lenses, photoelectric cell and associated amplifier, and subordinate equipment; in some cases however these members are assembled on the projectors before the main amplifier and fader are installed.

Although the reproducing apparatus adds materially to the mechanism of a projector, the parts have been so designed for each of the commonly-used makes of machines that their installation does not involve loss or extensive change of parts not immediately involved. Since the conduit and wiring work have been keeping pace with the installation of equipment, it should now be possible to connect the pieces of apparatus and check their correct installation and the wiring work.

Installation procedure is constantly being improved, and within a few months a noteworthy advance is to be made. In the present arrangement the driving motor and the disc turntable are mounted on individual pedestals, and the film reproducer and associated amplifier are supplied as separate units to be mounted on the projector, and the film-discs transfer panel is mounted on the wall of the room. Instead there will be a single pedestal bearing all of these members. The change will facilitate the work of installation and reduce the wiring needed, and furthermore will make the work of operation more convenient as well.

WITH the work well advanced in the projection room, the engineer next turns his attention to the stage. The horns are place on their mountings, which should be ready by this time, at locations presumably correct for the size and shape of the auditorium. After the loud-speaking receivers are attached and connected, there is the first opportunity to produce sound through the complete system.

A cursory test follows to assure that no major errors are present. and any immediately obvious imperfections are corrected. Comparative tests are then made between the reproducers on the projectors, so that any discrepancies in volume can be overcome. Each receiver and horn is heard separately, and then they are operated in unison so that the engineer can check their proper poling. Before the work proceeds further, the semi-porous screen on which the pictures are to be shown is installed immediately in front of the horns. Through this the sound will pass, seeming to come from the pictures themselves.

Reverberation Problem

Although for hearing of speech, reverberation is objectionable as preventing good articulation, when not excessive it is desirable for music since it tends to give the effect of fullness and roundness. A varying factor complicating the situation further is the absorbent property of the audience itself. There are theatres which empty are entirely too reverberant, but which are thoroughly satisfactory when filled. Attendance varies at different performances, of course, so that at best a compromise must be tolerated in considering acoustic adjustments.

While the use of ordinary drapes and similar material causes absorption of the higher frequencies to a somewhat greater degree than the lower, it is about the only practical method which can be employed to overcome acoustic difficulties from excessive reverberation and echo. Excessive damping must be avoided, to prevent a deadness in the sounds which may be almost depressing. Heavily-damped houses require greater amplification than would otherwise be necessary, but the presence of the audience has less effect than in a somewhat more reverberant house.

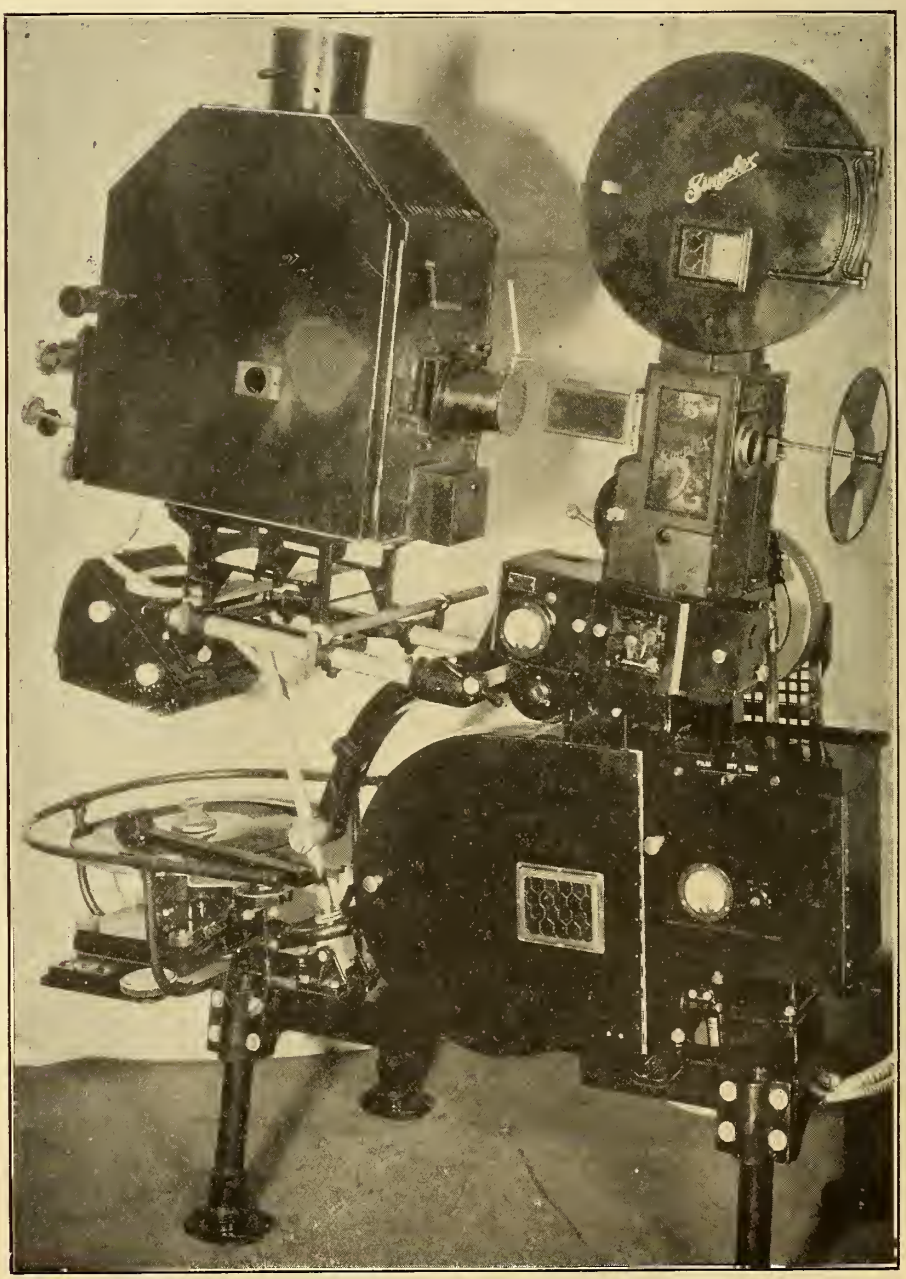
Correction of specific acoustic faults may be made with almost complete success, however. Echoes may sometimes be corrected by moving one or more of the horns, but the reflecting surface must be covered with heavy drapes when it is so located that no suitable echo-free position is available for the horns.

Interference usually results from reflection of sounds, and likewise can be prevented by adequate covering of the surfaces responsible. Resonance occurs when a surface made up of a thin, hard material, free to act as a diaphragm at its own natural frequency, is in the path of the sound waves. Distortion necessarily results, since only that part of the sound near the natural period of the resonator is reenforced. Here again covering is ordinarily the treatment used.

Three Prime Requisites

Bearing in mind the three prime requisites to good hearing, that sound be sufficiently loud for all amplifiers without being unnaturally loud for any; that successive sound be clear and distinct; and that the components of complex sounds retain their relative intensities, the engineer makes the acoustic adjustments. He usually tests first for sound distribution, arranging the horns so that as far as possible all parts of the house receive the same volume. Proper flaring and tilting of the horns is

(*Continued on page* 18)



W. E. projector equipment complete, showing new ERPI base

You'll never be "the GOAT" *with* RCA PHOTOPHONE

It's the man in the booth who gets the blame from both audience and management when things go wrong with a showing.

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But not so when his booth is equipped with an RCA Photophone projector. RCA Photophone films are just as flexibly handled and as simply projected as ordinary silent pictures.

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Stereoscopic Motion Pictures*

BY MAX RITTERATH

SO much has been written on the subject of stereoscopic motion pictures and so many experiments have been conducted that it is rather with hesitancy that one attempts to write upon it.

Stereoscopic motion pictures will never be created by a specially constructed camera or cameras or lens or series of lenses. It was surprising to read in the *Los Angeles Times* of Sunday, February 24th, 1929, on the front page: "Films to be Realistic, Third Dimension Plan Born," by Herbert B. Ives of the Bell Telephone Laboratories. Dr. Ives brings to life the old idea of projecting so that the images appear to the spectator as solid objects in space and this marvel he expects to accomplish by the use of about fifteen cameras with special attachment of moving lenses, etc., etc. Naturally, Dr. Ives cannot be serious about such statements.

Projecting a picture on a flat surface, no matter how the lenses of the projector are ground or how many pictures are superimposed on the screen, may result in illusion, but at its best constitutes an insult to the nervous system of the individual. A highly sensitive organism like the retina is super-mobile, and yet today we ask the millions of theatre-goers to sit for hours in a theatre, permitting their retinas to be held in a practically stationary or cramped position viewing an image on a flat screen.

This will not happen when my own screen is used since it is based on other theories from my findings after careful research and is constructed mathematically correct.

Prior to working out this screen practically every conceivable way of creating stereoscopic sensation had been delved into carefully. I have even gone so far as to use four cameras perfectly synchronized and four projectors projecting the recorded images into a tank filled with a semi-liquid transparent substance, only to learn of the explosion of another wrong theory. The subject of lenses has been covered from A to Z. Translucent screens with reflectors and two projectors have been constructed but we have to come back to the functioning of the retina and give to this organism a natural medium to satisfy.

The First Consideration

We have to consider first that mechanism which receives and records the image: The human eye.

The eye is the most delicate organism in existence. Take, for instance, the condor who is able, from the highest altitude, to distinguish its prey among the rocks of the treacherous mountain slopes of the Cordilleras, or the eye of a seaman which, on a clear day, distinguishes the masts and the rigging of a ship whose hulk is still behind the horizon.

Naturally we all recollect the comparison of the eye with the camera. I hope, in this article, to avoid that particular parallel since all my readers are familiar with this paragraph from previous readings. Instead I hope to explain my findings regarding the functionings of the eye in a plain and unacademic fashion.

Let us take a section of the retina and view it with ever increasing magnifications under the microscope and we shall find that we are just beginning to understand how far we still have to go in our research work to define the deeper functionings of the human eye.

Retina a Delicate Mechanism

We know that the retina consists of ten distinct layers delicately interlinked with a most marvelously arranged receiving and recording structure. The surface of the retina is formed by the fibrous system of the optic nerve. This layer is backed by successive layers of various structures until we come to the layer of rods and cones which are symmetrically arranged and which duly, by comparison and expansion, control the iris.

The functioning of the eye is mechanical —just like a beautifully constructed mechanism. A large amount of light coming from a brilliantly illuminated landscape or object will push with such force into the retina that the rods and cones are in turn compressed and expand and so relay the action to the muscles controlling the iris which closes down relatively to the intensity of the light radiations entering the eye. The iris is not an opaque structure like we use in a camera; the iris of the eye acts more like a retarding curtain. This expression must not be understood as meaning a filter since all the radiations, that is, multi-chromatic radiations, pass through the iris.

Now, how is the image received? For the answer to this question we follow the light from a source to the object and so to the eye and the result is very simple.

Light-Path to the Eye

Light radiations, after leaving the source, strike the object; this retards the velocity of the individual rays, which, after being reflected, have to traverse the distance from the object to the retina. Those radiations striking the near surfaces of the object reach the retina with more force than those striking the farther surfaces. Therefore the image is recorded upon the retina in relief. From this observation I have concluded my theory which is that:

Light from the source to the object travels at uniform force, but reflected light reaches the retina with a force proportionate to the distance the various radiations have to traverse from the various points of reflection.

So, then, since the radiations from the points nearest to the retina press with greater force and so penetrate deeper into the retina than the ones from the farther points, we receive the imprint of a full plastic relief upon the retina instead of the sensation of a flat image as is now received when viewing an artificial image projected on a flat-surfaced motion-picture screen. Since, in stereoscopic projection, we are trying to produce, through artificial means, a natural phenomenon, we must thus thoroughly understand the laws governing the latter. Our eyes gauge far and near surfaces and objects simultaneously, the light radiations forcing the images into the retina as we have proven above.

The Stereoscopic Screen

I have analyzed a good many eyes and projected cross sections by the use of my light cooling cell, the eyes being taken quickly from an animal just killed and put into a freezing solution.

This discovery that reflected light travels at varying force and relative to the distance of the points of reflection from the retina, I claim as my own and this law furnished me with a basis for the construction of my stereoscopic motion picture screen.

This, I have accomplished by superimposing layers of network or a specially woven honey-combed fabric specially treated with light-reflecting substances of various densities which creates in an artificial way what the retina experiences in viewing a natural object. Thus is produced a very practical screen which creates the desired effect and is further proving itself by the total elimination of distortion and eye strain. In other words we have many far and near points of reflection, in projecting an artificial image upon a screen, which constantly tend to change the surface tension of the human retina.

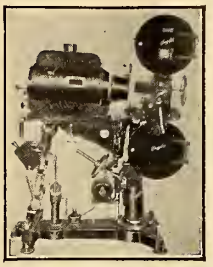
*Amer. Cinematographer, Vol. X, No. 1.

Latest Hertner Model

To provide more current in the arc at the projector and in order to meet increased light demands, particularly in connection with sound transmitting screens, as compared with the reflecting type of screen, the new C. P. type Transverter has been placed on the market by the Hertner Electric Co. National Theatre Supply Co. is handling distribution.

The new Transverter delivers within three per cent of the rated voltage under all conditions and loads within the rating of the generator, it is claimed. Voltage, it is said, is not affected by varying loads outside the booth, eliminating need for manipulating the field regulator throughout a performance.

Simplex
MODEL M



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MANUFACTURING ESSENTIAL EQUIPMENT WITH A COMPARATIVELY LIMITED DEMAND

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INTERNATIONAL PROJECTOR CORPORATION
90 GOLD STREET NEW YORK

Chaos in Hollywood

By BOONE MANCALL

¶ *The Decline of Cinema Aristocracy*

SILENCE, sadness and joy are the emotions reflected in the public prints these days regarding Hollywood. Hollywood never quite pleased everybody except the stars and near-stars who dwelt aloof from the common people on high Hollywood hills in Moorish, Spanish and other atrocious samples of misplaced architecture. But today even this nobility is sad, silent and miserable. As sound pictures are climbing to perfection and popularity these castles and palaces are tumbling—not actually of course—but soon we may see some of them go to the highest bidder at auction, their film owners no longer being able to keep them up in style. Unless, of course, they have been intelligent enough to work for and not fight sound pictures, to perfect themselves in voice and manner for the new technique. Which many of them have not.

When the axe falls—and it will fall soon—it will chop off the heads of stars, featured players, directors sub-title writers, scenario writers and executives. And with these will go a host of minor officials and "artists" who will have lost the protecting hand of an uncle, cousin, sister, brother-in-law or what-not. To replace these will come a new dynasty surrounded by a new court—such things are inevitable in any organization—but at least they will be capable rulers and capable subjects.

¶ *Stupidity Routed by Sound*

AS long as pictures were silent the favorites were secure; only advancing age or sudden disfigurement made them eventually dim but charming memories. There were many who even then railed against the cheapness of the screen but they were too few to make their protests effective. But now these favorites must be able to talk. If they can't, nothing will help them. They have been dumb so long that they have lost all refinement of speech. That is, their voices are not velvety and beautiful, as they should be on stage or sound screen, but raucous, as if they were used to shouting, yelling, screaming and screeching—things generally done at gin parties when the sense of hearing has become wooden. It became a habit.

The use of sensible speech helps toward the growth of intelligence. The lack of sensible speech in Hollywood naturally has hindered the growth of intelligence and so we find, as one critic of the motion picture—Mr. Robert Sherwood of *Life*—says, there are many who cannot remember their cues and lines when working in sound pictures. These too will have to go.

Of course there is now no longer any use for title writers because the actors will speak their thoughts. Scenario writers don't know how to write passable dialogue: they have worked in the silent medium and the business of putting sensible and witty words into the mouths of their characters is alien to their trade. They will have to go, too.

¶ *New Production Standards*

EQUALLY hard hit are many of the directors. They can no longer shout to the actors how to act right in the middle of a scene, because the sound recorder drinks in every sound. Whereas before they were able to bawl out in some such words as these: "Lift up your skirts, Miss Dollyrimple; remember this is a state-right picture." Instead they must be able to work with the actors before camera work is started, training them in the subtle inflections of the voice, to bring out shades of meaning, etc. They, not being trained to this kind of work, having learned nothing about the stage in the last decade, will have to go with the rest.

Making sound pictures requires a certain ability that is not possessed by the rank and file of Hollywood film executives. Although it is said that sound pictures are actually cheaper to produce than silent productions, it is not the cost of them that matters so much as their peculiar qualities which are vastly different from qualities in silent pictures. And our present executives are not trained to cope with them. So a new crop of studio managers and production heads are to be installed. And chaos reigns in Hollywood as a result.

¶ *New Influences—New Hollywood*

THESE changes are compelled by two agencies: if sound pictures are to survive they must go into effect; further, Wall Street bankers, who hate inefficiency and waste, are insisting that men of their own type, accustomed to handling men and money in the most efficient manner, be installed. It is no secret that Wall Street controls the picture industry today. They have millions invested in it. Their names are now blazoned in the film advertising. They have the industry pretty well under their thumb today and the pressure they exert is a good one. It will stabilize every department, make it profitable, eliminate waste material in personnel; make good pictures, and best of all, cut out the fuss and feathers and force everyone to be businesslike. If we are to have art in this age of business then it will come only through the generosity of business—and business to be generous must be profitable.

Chaos reigns in Hollywood. The city of Arabian Nights Entertainments has been rocked to its foundations. Its smugness, its assurance, its complacency, its snobbishness, its self-imposed aristocracy of overpaid players is being ruthlessly scattered by science (sound) and by money powers that have no use for and no patience with the frivolities and incapabilities of our movie world.

A new Hollywood will arise—splendid, efficient, able and talented. Pictures will stream from it that will not only make money but will delight and charm the most discriminating and most facetious filmgoers, and the moving picture will win to it thousands of intelligent people who cannot now stomach one tittle of its inanities.

And every worker will benefit, no matter how lowly his place.

Legislation and Your Livelihood

BY ALFRED L. CRISWELL
Secretary, L. U. 171, Pittsburgh, Penn.

FOREWORD: Emphasis is placed on the fact that the following comments by Secretary Criswell represent his personal views and should not be construed as an official expression by him in his capacity as Secretary of L. U. 171.

IN the last issue of THE MOTION PICTURE PROJECTIONIST there appeared a short reference to a so-called "Electrician's Bill" which was about to be presented in the Pennsylvania State Legislature, and Local Unions were cautioned to be on guard against the presentation of similar measures in their home states. Since that time, we here in Pittsburgh have had many inquiries from Local Unions of projectionists throughout the country asking for detailed information on this measure, and it is apparent that it would not be amiss to devote considerable space in these columns to an outline of the bills, and if possible, forecast just what they will mean to projectionists should they become laws.

The "Electrician's Bill" was introduced in the Pennsylvania State Senate by Senator Mansfield, despite numerous protests from both his constituents and colleagues, and bears the official title of "Senate Bill No. 462." It was accompanied by a companion measure, "Senate Bill No. 463," which is in reality the enabling act that defines the duties of the "State Registration Board for Supervising Electricians" and sets their salaries.

The purpose of Senate Bill No. 462 (if one is to be guided—or misled—by its heading), is to "safeguard life, health, and property by providing for the registration of supervising electricians." Glancing over its many paragraphs, we find that it will permit us (thank Heavens!) to repair our electric irons or other portable electric appliances in our homes without the necessity of becoming supervising electricians, and, if we are engaged in medical or surgical work, we may operate and, presumably, repair our tools without interference or license. Whether this privilege also supplies to chiropractors, we have been unable to determine.



Clayton A. Dietrich, Pennsylvania Legislator and a member of Local 171

All other work performed *in which an electric current is used to operate the device,* irrespective of character or type of device, must be performed by a "licensed supervising electrician" under the provisions of the bill.

Requirements for License

The path to becoming a "licensed supervising electrician" is beset with many difficulties. All that is required is that one have had "ten or more years of active practical experience and work," or that one be "a graduate from a school or college approved by the Board" and "having a course in such work of not less than four years and an *additional* two years of active work as covered by this Act." Simple procedure, isn't it?

Of course, the Board reserves the right to "pass upon the qualifications of an applicant for registration;" and "should the Board deny the issuance of a certificate of registration," one-half of the registration fee will be returned and *the balance forfeited as an examination fee.*

As is usual with the offspring of any legislative mind, there must be exceptions, and in the present case the exceptions are amusing; although, should the bill become a law, they would prove tragic. "Any person who is engaged as a helper, assistant workman or apprentice to a registered supervising electrician" when working under the *supervision* of said electrician is *not required to register.* Neither is an officer nor employee of the United States Government.

The "Supervision" Feature

It will be apparent from a reading of this outline thus far that the dominant thought which seemed to run through the minds of the creators of this bill is "supervision." "Supervision" apparently assumes in the minds of these able legislators the same gigantic proportions as a panacea for all human ills that Lydia Pinkham's famous remedies assume in the minds of so many of our overworked women—the great



Alfred L. Criswell

cure-all for almost anything but forest fires and hoof-and-mouth disease.

If, for example, you should happen to be one of the chosen few who could secure licenses under this measure, the Board has the power to revoke your license if you are guilty of "negligence, incompetency, misconduct, fraud or deceit in the work of a registrant." Whether this section will later be amended to include "moral turpitude" has not yet been determined. However, if your license is taken away from you, the right is granted to engage the services of several attorneys and appeal from the decision of the Board to the *Court of Common Pleas of Dauphin County.*

Practical Application

A practical instance of how this feature would work out lies in the fact that this particular court is located about 150 miles from the writer's home city, with a possible trip back and forth certain to entail great expense. Incidentally, the decision of the court is final under the provisions of the bill, and one may not appeal to a higher tribunal.

The fees for registration will be $15.00 for the common garden variety of electricians and $25.00 for the college men. Personally, we can't understand the logic of this distinction between the two classes, except that our distinguished body of lawmakers would penalize the seeker after education.

The powers of the Board of Supervising Electricians are "well defined." They can do anything at any time and at their own discretion so long as they keep within the confines of this bill, which, it might be well to say, allows the Board practically unlimited authority to exercise its power over any and all things in the way of electrical devices and appliances.

The provisions of the bill are severable. In other words, if any *one* provision of the bill be declared unconstitutional, all the other provisions remain in force as though no contest had been made. To

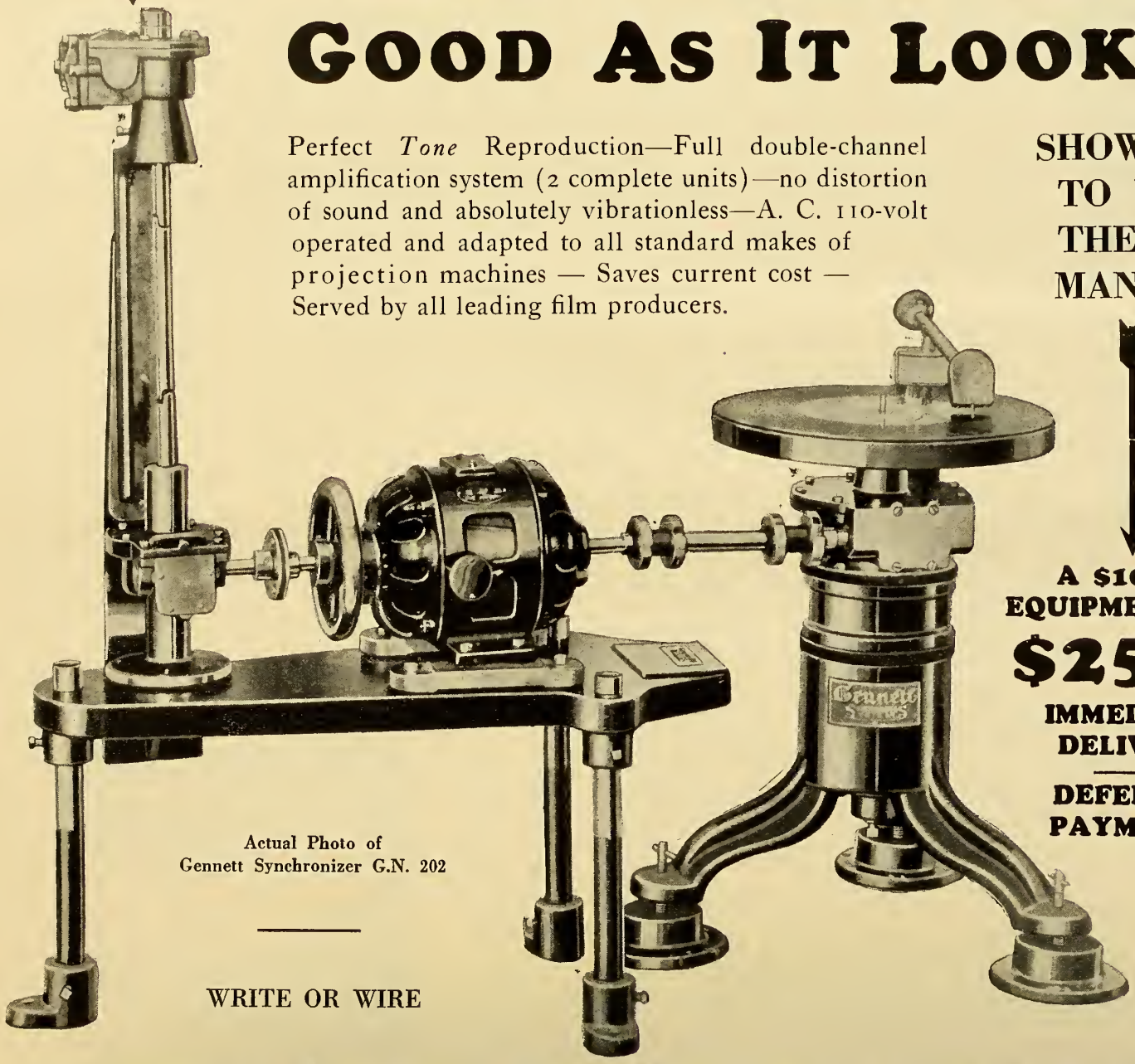
(*Continued on page* 19)

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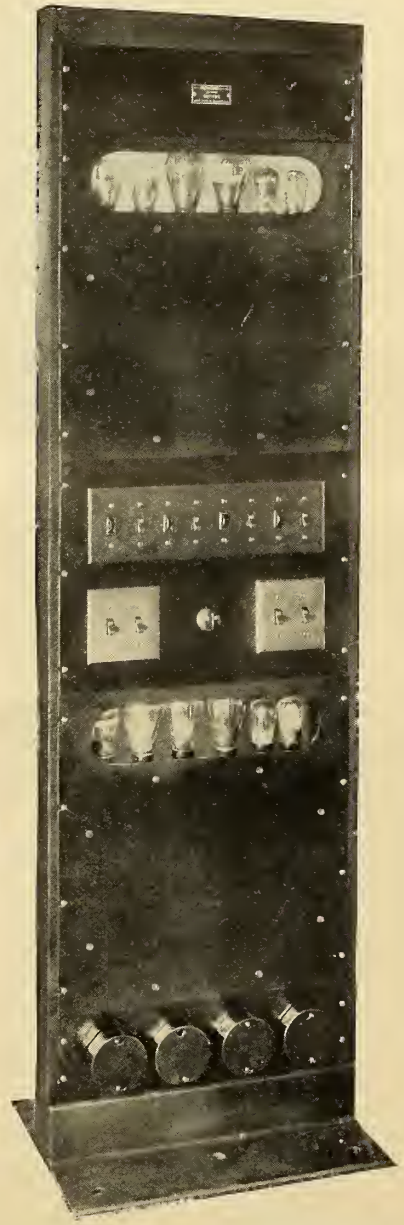
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Actual Photo of Double Channel Amplifier That Is Part of Model G.N. 202

WRITE OR WIRE

General Sound Equipment Corporation, 1650 BROADWAY NEW YORK

Wolff-Heide Color Process

BY HANS VON FRAUNHOFER
President, United Film Industries, Inc.

This is the second of o series of orticles by Hans von Frounhofer who contributed "Whot About Color Photography" which oppeared in the November, 1928, issue. Mr. von Fraunhofer has just soiled again for Europe, and upon his return lote in Moy will contribute to these columns orticles not only on color film but on projection conditions generolly and new equipment in particular which is now being developed there.

SAMPLES of the new motion picture film in color, processed by the Wolff-Heide system, have just been received in the United States from the inventors in Berlin, and a short inspection of the small strips shown indicates a very pleasing range of hues, excellent transparency and truthful tonality. At this time it is interesting to note that a feature film using this process to incorporate color in the picture is now in preparation in Berlin. It will run between three and four thousand feet in length and is expected to be ready for showing in New York some time in June, this year.

The German photo-chemist, Emil Wolff-Heide, has succeeded after approximately twenty years of experiment and research, in perfecting a process for the production of really natural color motion picture film. His work, in its present stage of completion, is expected to be the final answer to this long-existent and important problem.

Summary of Process

A brief summary of the system resolves itself into a series of purely laboratory steps, with which the camera man and projectionist need not concern themselves, other than possibly a desire to be familiar with what the laboratory does to the film. It is purely a photo-chemical process and requires no change in either taking camera or projecting machine. Boiled down to the bare details of the process the various operations are as follows:

1. The preliminary bathing of an ordinary monochromatic motion picture negative in a solution which adds to the emulsion certain chemicals and dyes which facilitate practically perfect color separation at the time of exposure.
2. Exposure in any standard motion camera in the usual way, with no alteration in camera, lens or shutters, using no filters, prisms or mirrors.
3. Usual development, fixation and washing of the negative, followed by immersion in two different chemical baths and three dye baths, which add to the developed negative certain colors which are complementary to the colors called for in the finished positive. This done, the negative is now ready for printing.
4. Preliminary bathing of the ordinary monochromatic positive film in a bath similar to the chemical and dye bath used for the negative in its preparation.
5. The printing of the positive film, using the prepared negative as described in the first three paragraphs. The ordinary standard printing machine is used with no change whatever.
6. The development, fixation and washing of the exposed positive followed by the same chemical and dye treatment as was accorded the negative with the difference that now the true colors and not the complementary are added and retained.

That is a brief summary of the steps taken to produce a colored motion picture positive print by the Wolff-Heide process. Additional prints may be made in any quantity, the number only controlled by the amount of wear the negative sustains in passing through the printing machines. Any number of "dupes" or duplicate prints may be made, each one, of course, going through the process outlined in Paragraphs 4, 5 and 6. This shows its adaptation to the commercial production of film.

Features of Process

The finished positive is no thicker than any of the present film, contains all of the colors in one single frame, and the projection of it is done in any standard motion picture projector, with no alteration whatever and no increase in the amount of light necessary to produce a good screen image. Colors are contained in each and every "frame," there is no "color-fringing" as is the case with other systems; furthermore, exact registration is maintained throughout.

A certificate of analysis furnished by the Ferguson Laboratories of New York City, chemical experts and consultants, further substantiate the statement that it is not a hand-colored product, they having examined it under the microscope and find no overlapping of colors, neither is there any clear spaces between adjacent colors. They bear out the statement that it is a photo-chemical process, having determined by micro-measurements that there is no appreciable silver left in any portion of the film where color is present. They found by scraping that all of the colors were present on one side of the film only and that in any one of a number of frames, red, blue, green, orange, brown, yellow-brown, green-yellow and light blue were present.

Moderate Cost

Total cost of processing is less than one cent per foot, about three-quarters of a cent, not taking into consideration the fact that less expensive negative and positive film is used as a basis. Persumably this might be cut when handled on a large commercial basis. The cost, while a factor in itself, is secondary to the results, if the process lends itself to the varying conditions in the motion picture world. It is apparently applicable to the amateur sizes of 16 m/m and 9.5 m/m, but of course is more expensive than the present method of reversing the negative to a positive, involving as it does the making of a negative and a positive.

For the international exploitation of the Wolff-Heide process which promises to revolutionize the entire photographic and film industry of the world, a syndicate of New York and Philadelphia capitalists have formed, last week, the Wolff-Heide Photochemical Corporation, with headquarters in New York, with a total capitalization of 1,000,000 shares, all of which will be absorbed by this syndicate.

Editor's Note: Since this article was prepared it has been learned that Mr. Wolff-Heide will arrive in this country early in June for the first public demonstration of his process, after which a manufacturing unit will be established in this country. Of particular interest to projectionists will be the news that in combination with the development of this process several new pieces of projection equipment of radically altered design from the conventional will be introduced.

Mills—and What They Are

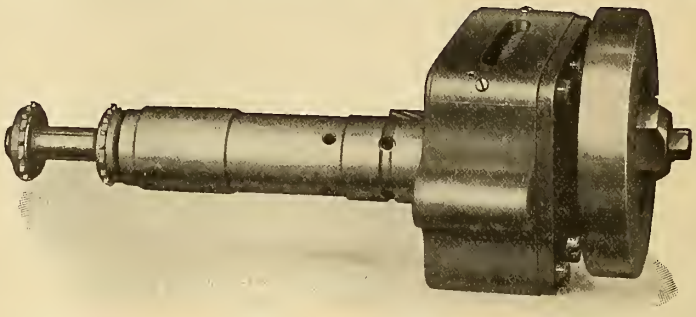
The theatrical papers are certainly the snappiest on earth, but in technical matters, however simple, they are about as ignorant as one can be without trying. Last summer there was considerable speculation among the Broadway savants regarding standardization of sound track width on talking films, and the trade papers found numerous occasions to write about 80-mil sound tracks, 100-mil sound tracks, and so on. But they hardly ever printed it "mil." Frequently it became "mile." Again it was "mill." And "millimeter." But a mil is neither a mile nor a millimeter. A mil is a thousandth of an inch, and nought else.—RADIO BROADCAST.

English Sound-Color Studio

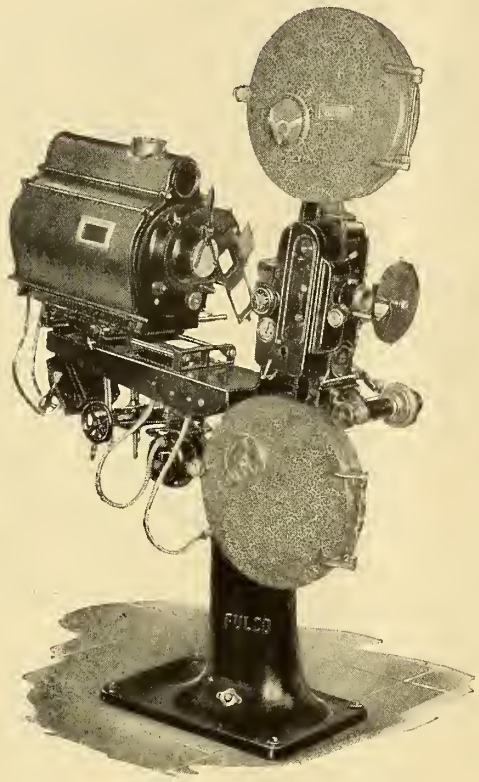
The first sound-color film studios in the world have been opened at Elstree, England, by the Blattner Picture Corp., of which Ludwig Blattner, who has worked for many years in developing color processes, is president. Production on the first feature with sound and color will get under way at once.

The color process used will be the Blattner-Keller-Dorian system, whereby the pictures are actually taken in color and not restore by super-imposition on the negative after exposure.

NEW FULCO PROJECTOR



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FULCO PROJECTOR
Ernemann Design

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Synchronous Motor Control

By NAT SHAUB
Local 306, New York

AMID the welter of new equipment that has been introduced with the advent of sound pictures, none is more interesting and more complex than the motor control box. Information on this piece of equipment has appeared in these columns,* and the following information is intended to supplement this splendid article by Mr. Stoller and to supply detailed information on the points mentioned in his somewhat general outline.

Recently there appeared in these columns editorial comment on the failure thus far of manufacturers of new equipment to supply the details necessary for intelligent operation and care of their equipment, and this certainly is true of those companies making sound picture apparatus. What little information has been made available by them is of so general a nature that projectionists, to whom is entrusted the efficient functioning of the apparatus and to whom everyone looks to hold up their end of the efforts being made to put sound pictures over, are practically left to shift for themselves and go out of their way to secure information that should be available for the asking.

Personally I became interested in the motor control box of the Western Electric sound system. I approached a number of ERPI men and asked a few questions. Some of them started to "shoot at the moon," so to speak, while others "admitted" that they did not understand it themselves and therefore could not explain it. Whether these men were simply following instructions to give out no information, or whether they were expressing themselves candidly, I do not know. But I determined that if I were to understand this particular piece of equipment I must strike out and get the information for myself. Which is just what I did.

*"Speed Control for Sound Systems," by Hugh M. Stoller, December, 1928.

Governing Circuit

The governing circuit of the speed control is a special bridge circuit. One arm of the bridge consists of a tuned circuit consisting of a condenser and an inductance. The circuit is tuned to 720 cycles, which is the frequency emitted by the small alternator when the speed of the driving motor is 1200 r.p.m., which is the correct operating speed for the motor. This speed is geared down to 90 r.p.m. for the projector, and to a still different speed for the turntable.

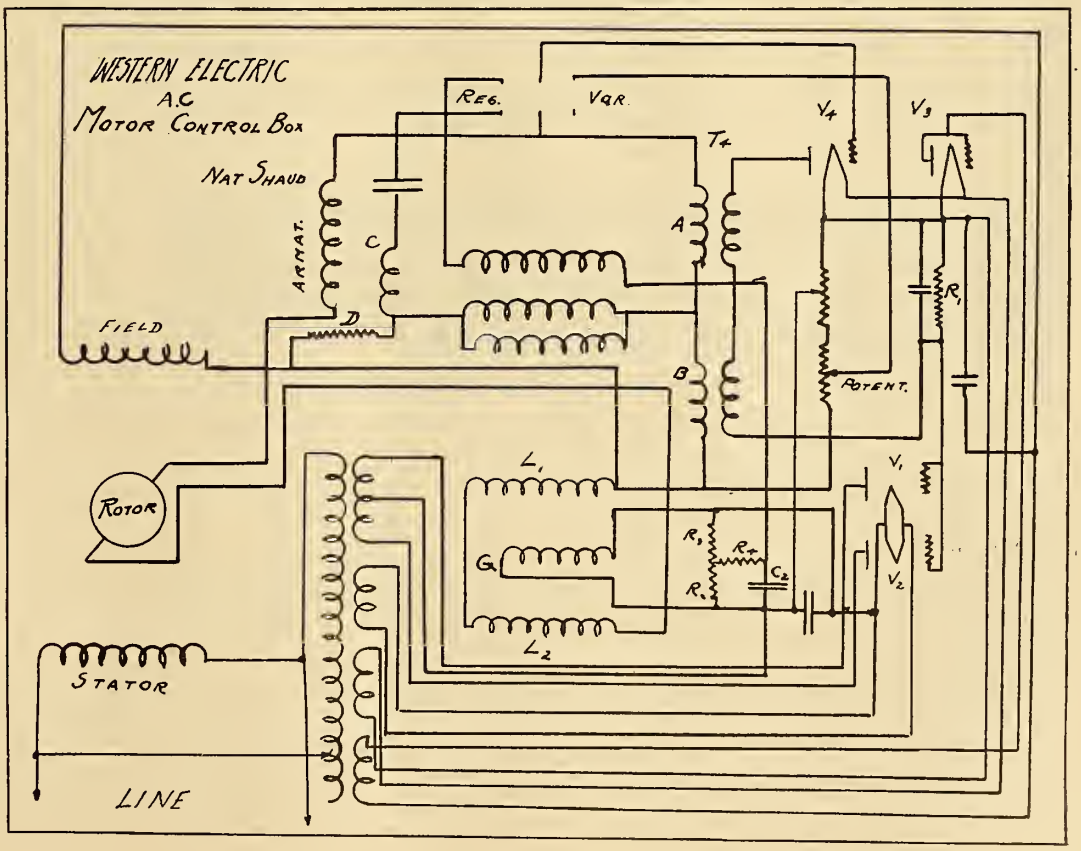
Since the circuit is tuned to 720 cycles current will pass freely through it, and we may regard the impedance of the arm as that of resistance only. The second arm of the bridge consists of a resistance of the same value. Therefore, at 720 cycles, the ratio of the two arms will be unity.

The other two arms of the bridge are made up of the primary of a transformer tapped at its midpoint, which, of course, makes their ratio unity also.

The small alternator is connected across the primary of the transformer and is the source of power for the bridge. When the bridge is balanced (and it is at 720 cycles), the potential between the tuned circuit, the resistance and the midpoint of the primary of the transformer, will be zero. (See E in diagram.) The instant there is a variation of motor speed, there is obviously a change in frequency either above or below 720 cycles; there will be a phase difference of 180°. In one case the current will be leading; in the other it will be lagging—depending on whether the frequency is above or below 720 cycles. This abrupt change in phase is used in controlling the speed of the motor.

The controlling circuit consists of a three-legged inductance. The two outer legs—L_1 and L_2—are connected to the motor armature and serve as an impedance for controlling the speed. The middle leg, G, carries a direct current winding.

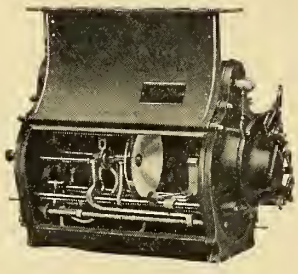
(*Continued on page* 25)



Schematic wiring diagram of W. E. motor control box, A. C. This diagram is supplemental to those which appeared in Hugh M. Stoller's article on speed controls in the December, last, issue, and those which accompanied "*The Motor Control Box*" in the March issue in which a D. C. panel was also shown.



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Installation and Adjustment of W. E. System

(Continued from page 8)

usually sufficient to give adequate distribution.

Any acoustic peculiarities are next investigated, and where possible corrected. Many hours are often spent in moving the horns and adjusting their placing, since slight changes in position sometimes produce marked differences in the acoustic effect. When the best results demand further acoustic treatment of the auditorium, involving alterations to the building or extensive changes of the wall surfaces, the manager is so informed.

One standard practice followed in all cases is to cover the horns, and the back of the screen, except the area occupied with the horns, by absorbent drapes. It is usual, also, where the screen is set back from the proscenium arch, to hang drapes around it, in shadow box effect. By these precautions back-stage echoes and reflections are avoided.

Check on Amplifiers

After the horn locations have been definitely fixed and the equipment given a final check, the engineer calibrates the amplifying apparatus for the particular theatre. He has at hand several test records which make available a wide variety of the types of entertainment to be shown, each marked with the fader setting determined in a theatre which has been chosen as "standard." By playing these records with the fader set at the marked value and adjusting the main potentiometer until the proper effects are received, he sets the potentiometer at a presumably proper permanent adjustment, in keeping with the size of the theatre, so that in the future good results can be obtained from any records by adjustment of the fader only.

In addition, various types of records require that varying volumes be obtained from the different horns. From the tests the engineer can choose the relative volumes for different types of selections, and establish the horn settings which will normally be required.

During progress of the installation, the projectionists and their assistants are instructed in the operation and maintenance of the new equipment. At the outset each

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man is given a bulletin, which gives detailed information on every necessary point. By the time the theatre is calibrated the men should be familiar with their new duties, and should be able to present a complete program without assistance. An opportunity soon comes to show their facility in the rehearsal of the opening program.

At the early performances the closest attention is given, to be sure that the system is being operated to give the desired effects. In addition, however, watchful attention should be continued as a permanent function of the theatre management, if the best results are to be secured.

Whenever a sound program is in progress either the manager or somebody specially appointed should be present in the audience. By his own reactions, and by noting the effect on the audience, he observes the need for any changes in volume or otherwise. Likewise he watches for any extensive change in the degree to which the house is filled, or any other circumstance having a bearing on the picture as presented. A buzzer signal and a telephone are provided for communicating instructions to the operating room.

Legislation and Your Livelihood

(*Continued from page* 13)

punish anyone who would be so rash as to violate its provisions, the bill provides a penalty of from $25.00 to $50.00 for the first offense, and for subsequent offenses (horrors!) a penalty of from $200.00 to $500.00 or six months in the village bastile, *or both,* at the discretion of the Court. If this bill ever passes, a cigarette fund will have to be started, for it is obvious that no average projectionist can keep out of so much trouble.

NOW as to the make-up of the august Board itself. Here is where Senate Bill No. 643 gets in its business and takes the center of the stage. Its *announced* purport is to reorganize the administrative and executive work of the Commonwealth, but its *main purpose* is to DISorganize projectionists and legislate them into another craft. Hidden away deep among the whereases and wherefores and other dark recesses we find the "State Registration Board for Supervising Electricians." The Board will be manned by (1) The Superintendent of Public Instruction, as an ex-officio member; (2) the Chief of a Board of Fire Underwriters, and (3) *Four* supervising *Electricians* who have been in responsible charge of *supervising electrical work* for a *period of five years.*

Summing up these measures which dovetail so nicely (for others) together shows us that under their drastic provisions the projectionist and the stage electrician would have their livelihood legislated away from them. We find that no member of our craft could attain membership on the Board, particularly so in view of the shortsighted attitude which characterizes every act of certain factions these days and which would effectively block every effort on the part of our men to become registered supervising electricians.

The "Safety Screen"

These measures are vicious and unprincipled examples of class legislation having their conception in the minds of the directors of an organization utterly devoid of even the common decency usually displayed by an organization in its attitude and relationship with another organization. Bluntly stated, this particular bill and similar measures are merely attempts to gain control of the jurisdiction now enjoyed by the I. A. T. S. E. & M. P. M. O. U.—the while, however, they are presented in legislatures as being fundamentally "safety" measures.

The fight to be waged against such encroachments cannot be too well planned or too vigorously waged. While the situation outlined above is the first instance of the fight coming right out into the open—even though cloaked with the protective clauses and ramblings of a legislative "safety" bill—the inevitable conclusion to be drawn from the incident is that the battle against us has been studied in every detail and planned with extreme care.

Every Local Union has had similar experiences from time to time which should have served as a warning to them. Every effort made to take over work which

(*Continued on next page*)

Two New Improvements for the booth

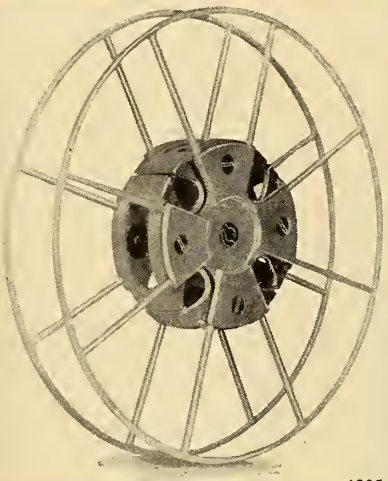
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

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THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

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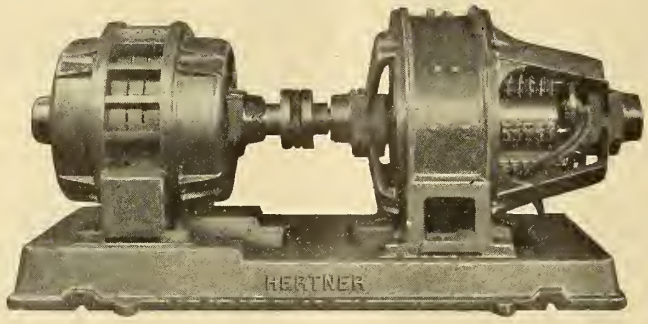


4235



THERE are a hundred uses for this soldering iron in a projection room. This new electric iron eliminates the serious fire hazard and saves the time and trouble involved in the use of old style flame-heated irons. It may be used interchangeably with a melting cup or soldering tip, as illustrated. Convenient, reliable and economical.

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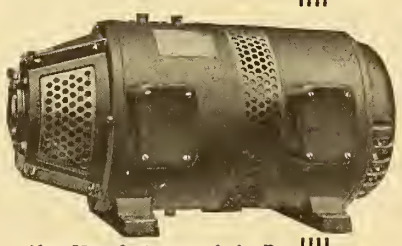
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735 Hamilton St. Allentown, Pa.

Pacent, Sued by W. E., Denies Any Infringement

In answer to printed announcements that Western Electric Co., its subsidiary, Electrical Research Products Co., Inc., and American Telephone and Telegraph Co. had filed suit for patent infringement against the Pacent Reproducer Corp. and Pacent Electric Co., Inc., for their activities in the sound picture field, Louis Gerard Pacent, president of both Pacent companies has issued a statement which embodies an emphatic and complete denial of all charges of patent infringement.

Sees Pacent Expansion

"Before the Pacent Reproducer Corp. began the manufacture of sound picture equipment," said Mr. Pacent, "we investigated the patent situation thoroughly in all its aspects. We were convinced then, and we are convinced now, that there is no infringement of any kind. We are going ahead in a bigger way than ever with the manufacture of our equipment, and we are confident of the continued expansion and development of our sound picture business."

From exhibitor standpoint, Mr. Pacent said that his company guaranteed protection to all exhibitors against suits on patent infringement. He added that he believed the present suit against his company was inspired by the success enjoyed by the low-priced Pacent machine.

Unions at Odds on Metal Sign Business in New York

Sheet metal workers and electricians are at loggerheads in New York City over the matter of jurisdiction on the hanging of electrical theatre signs, a field in which there is great activity just now. The sheet metal workers have heretofore had this business exclusively, but of late the electricians have insisted that this work is strictly within their jurisdiction.

The sign for a new long-run feature picture which opened at the Central Theatre on Broadway was hung by the electrical workers under police protection.

Legislation and Your Livelihood

(*Continued from preceding page*)

properly belongs to the Alliance must be resisted at all costs. We have but to recall the expense of time and money necessary to maintain our prestige in the studio affairs, and this experience must be put to work now more than ever.

With the introduction of sound pictures, involving as it does increased work and responsibilities for the projectionist and, of course, increased remuneration, the craft must be more careful than ever that our jurisdiction is not violated by any other organization or group of organizations. It has always been the personal contention of the writer that any apparatus that is attached to or connected with a motion picture projector, or which is operated from within the confines of a projection room, is properly the jurisdiction of the projec-

tionist and as such should be *maintained and repaired by him and him alone.*

Before we get all "het up" over this jurisdiction business, let us chart the path of these bills in Pennslyvania. Bills almost identical with those presented in the State Senate by Senator Mansfield, were presented to the Executive Board of Pennsylvania Federation of Labor and were approved by that body despite the fact that Brother Katz, Secretary of the 4th District and a Vice-President of the Pennsylvania State Federation of Labor, strenuously opposed them and explained their unfair principles to members of the Executive Board.

This, then, was the first step made by the interests pushing this legislation, and demonstrated the necessity for keeping an eye on the Executive Board of the State Federation of Labor. The next step was the presentation of the bills in the Senate by Senator Mansfield. An effort to present identical bills in the lower House was forestalled by a bit of quick action which will, we believe, prove amusing to relate and will exemplify the need for co-operation among all Locals fighting measures of this kind.

"Entertainment" a Fizzle

A certain member of the lower House was approached by the interests backing these bills and much money was spent in entertaining him. An elaborate banquet was arranged in his honor and those present shed many tears over the sad plight of the dear public who would be best safeguarded by the presenting to the Legislature of these "Electrician's Bills." Word of this gathering was wired to Pittsburgh, and the Local Unions who were in the confines of the legislator's district received word to protest any attempt to present these bills. Much to the surprise of the legislator in question, the following morning he was deluged with letters and telegrams from his constituents protesting his sponsorship of either of these bills.

In reply to the Secretary of one Local, he stated that he would not present these bills, had no intention of presenting them and would oppose them if presented. We regret that the Locals which participated in this move cannot be revealed because we feel that an injustice might be done the legislator in question, who, we believe, was acting in good faith but was in grave danger of being misled. They can rest assured that the men in charge of the opposition to these bills fully appreciate the valuable services they rendered. The fight against these bills has been centered in the Senate and the leaders have been enabled to keep in close touch with the situation.

At the State Capitol in Harrisburg, Vice-President Harrer of the International Alliance, President Sipe of Local Union No. 171, Secretary Katz of the 4th District and State Legislator C. A. Dietrich, a member of Local No. 171, have been guarding the interests of the International Alliance. These men have been in daily attendance at the sessions of the State Legislature and have been untiring in their efforts to defeat these measures.

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The Patent Situation

By JAMES J. FINN

MOTION picture patent litigation, more or less dormant since the early days of the industry, has again come to play an extremely important part in the development of the business. Not since the days of the valiant stand of a few struggling independent inventors, film producers and distributors against the vicious edicts of the Motion Picture Patents Company—now defunct, happily—has the industry been so shaken by the reverberations of patent suits as now. Sound pictures, of course, are the root of all evils now arising from the welter of patent litigation within the industry. With the development of sound pictures—even a little before their birth—the industry graduated into "really" big business, with its inevitable Wall Street influence. This meant the influx into the industry of legal departments to whom patent litigation was, it might be said, second nature.

Patent suits are innumerable in their variety—ranging all the way from the strictly "on the level" kind to the pre-arranged brand through the mechanics of which the loser is pre-determined, in consideration of which (not forgetting the weak fight he puts up in court), a license to use certain patents is tossed his way, and the winners go away content with having the court action to cite as a very valuable precedent.

The small-fry infringers—John James of Coshocton and his ilk—are not even accorded the doubtful honor of being made the defendant in a patent suit. Mr. James and his tribe may run wild along the by-ways, sniping from this patent and that, and never be accorded sufficient attention to warrant their receiving even a harsh letter. When holders of valuable patents go a-hunting the sights on their guns are always adjusted so as to include only those who are commonly known as "big shots." This practice invariably doubles the fruits of victory, for the winners thereby gain not only their victory but much invaluable publicity as a result of their having hooked a "big one." This "scare" publicity is priceless.

The "Experts" Convene

Battling in this arena of patent suits we find the honest man and the charlatan, the wise man and the fool; the one intent upon proving the right of his contentions and the other busy in beating his drum and stirring up a lot of noise—mostly bombast which issues from his pompous person as naturally as water from a faucet. Learned "authorities" contribute articles to the reviews and the trade papers, the while keeping a sharp eye open for possible retainer fees as an "expert" as a result of the publicity they have received from sleepy editors. This does not imply that all contributors of patent information are frauds; not at all. But the woods are full of hicks, rubes and just plain ordinary sharpers who advance their claims of special knowledge with a nerve that is at once colossal and amazing.

Assiduous study of current patents and brushing up on the history of patent literature does not turn out an "expert." What does constitute an expert is the man who has accumulated his knowledge of the art through years of reading and collecting even the smallest scraps that have any bearing on the subject. Bibliography and intelligence make a patent authority—and most present-day "experts" have little of the former and even less of the latter.

All this nonsense is detrimental to the progress of the business. Sales of sound picture apparatus is being retarded greatly these days by the fear of the exhibitor that if he buys this, that or the other device, a patent suit will shortly loom on the horizon, the result of which will render his apparatus null and void and seriously endanger his chances of ever getting back the money he paid for it. Certain patent suits also have been known to serve no useful purpose other than to scare off prospective promoters of competitive systems.

The exhibitor mulls over the matter for a while, and then proceeds to spend his money to buy an outfit which he is certain will not be affected by the fluctuations of the patent market. Very often the apparatus is bought on the basis of "patent protection" rather than quality. Such a condition is rampant today in the motion picture industry.

The C Bias Situation

Amplification is the hub around which most current patent litigation revolves. Any amplifier, to function properly under ideal conditions, must have in its circuit a "grid leak" (non-inductive high resistance) and a potential. This potential is known as "C bias." The former has been in use now for quite a number of years, and its use is common practice now in radio circuits as well as in amplifiers using three- and four-element tubes as a means of amplifying sound or electrical impulses.

The use of a C bias potential is decidedly important, and without it the vacuum tube will not function properly, which fact is common knowledge in radio circles and in the sound picture field.

Many attempts have been made to obviate the use of the grid leak and the C bias potential, but these contributions to the knowledge of the art soon fell to the wayside because of the poor amplifying results obtained—and this despite the fact that some of the best scientific minds in the country were concentrated on the task.

The use of the C bias potential and the grid leak is vested solely in fundamental patents which are now held by certain interests. These patents sew up the right to the use of the C bias and the grid leak most effectively. The patents naturally constitute a big stick, so to speak, which may be used against anyone attempting to use them for any purpose whatsoever.

Prior References

It is interesting to note that credence is attached in some circles to reports that the use of the C bias potential and the grid leak has been described in technical literature prior to the date of conception of the inventions as set forth in the patents now held by certain interests. It is intimated that the subject is described in detail in the technical literature of the art, especially so in the German literature, where so many valued contributions have been made to the art prior to the issuance of the present patents.

This literature is dug away in the archives of the technical press, and it is only accessible to those bookworms who are conversant with the subject matter as well as with the art itself. The holders of the existing patents on the C bias and the grid leak naturally do not attach much importance to the existence of this data, but it would not be surprising if the material were available right under the very noses of those patent attorneys who rush about so madly in quest of citations for their clients and who emit so much steam which, fortunately, is soon dissipated by the decisions of the courts.

So much then for the C bias and the grid leak. These points are about the only thing of importance which are litigated these days in the sound picture field. The rest of the claims and counter-claims are so much hot air, pounded out by some frantic publicity agent and issued for what "scare-effect" it may have.

Settlement Demanded

Within the industry the demand is growing slowly but surely that the matter be settled once and for all, and that quickly, so that the business may regain its even keel and proceed with the business of selling admission tickets. This lecturing of exhibitors, these gaudy announcements of "our patent rights this" and "our patent rights that" contribute nothing to the industry but uncertainty and its resultant poor business.

If all the claims of certain patent holders were chucked into a basket and shaken well, with the valid claims permitted to sift through to the bottom, there would be a vacuum at the bottom.

So then, when next we hear the rumblings of an approaching patent suit, it would be best to compose ourselves and sit back calmly with the assurance that what certain interests hold in the way of patent rights are not likely to be invalidated by the efforts of any of their present competitors, and that all this shouting about infringement (excluding the C bias situation), is just so much hot air.

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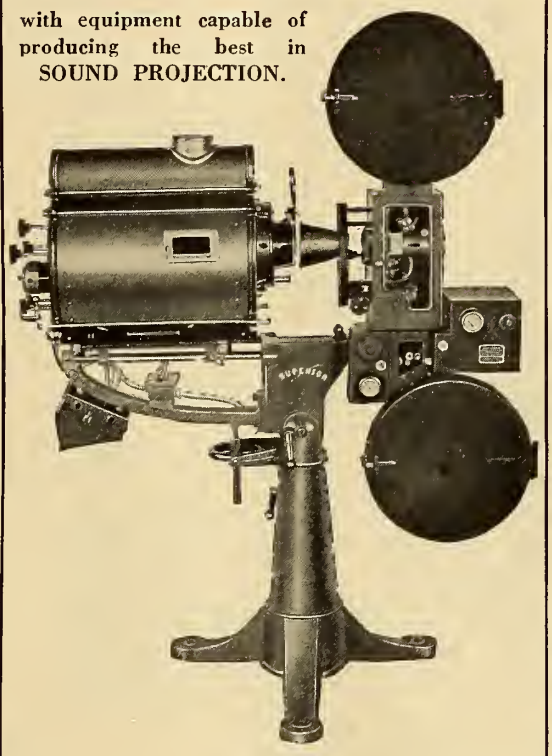
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Correspondence

MR. E. BAUMER'S comments on certain additions to projection nomenclature which appeared in the March issue provoked several responses. Mr. Hill, of St. Petersburg, Florida, whose comments recently on projection nomenclature formed the basis for the observations made by Mr. Baumer, remained strangely silent in defense of his own theories. Typical of the comments received is the following from Bert Mellinger, Philadelphia:

"I have just read Mr. E. Baumer's comments on nomenclature. He says, 'A projector is never inclined 20 degrees from the vertical at the aperture, and the film always passes vertically at the aperture' Now, I may have failed to grasp just the meaning he wished to convey, but it appears to me that one would not have to be in the business since 1900 to know that the screen is not always on a level with the projection lens, but is usually below it. Naturally, the projector is tilted downward toward the screen; and the aperture, being vertical when the projector is absolutely level, moves out of the vertical when the projector is tilted. In some instances it is 20 degrees; in others, more.

Correct Film Speed

"Then, under the heading 'Correct Film Speed.' Mr. Baumer says: 'A picture projected at 60 f.p.m. is "natural-looking," and the figures on the screen will move in an absolutely lifelike manner.' How can Mr. Baumer maintain this position in view of the fact that the camera speed in making the picture ran anywhere from 70 to 90 f.p.m.? As for the titles being too short to permit easy reading, this is taken care of by the producers who simply make the titles of sufficient footage to be read by any average person.

"Furthermore, who would care to look at a picture projected at 60 f.p.m. when a H.I. lamp is used as a light source—not forgetting a two-blade shutter? This combination of speed and equipment would surely make 'patrons' eyes pop out of their sockets.'

"In closing, I wish to say that I see no valid reason for calling a projector a 'machine'."—BERT MELLINGER.

The Missing Link

Mr. Mellinger's contribution is appreciated, but we were just one whit surprised that Mr. Baumer's allusion to the superior projection standards prevailing in Europe did not get a rise out of some enterprising projectionist who would rush to disprove the monstrous statement that anybody anywhere could possibly exceed America in anything. Failing in this, we bring this issue of "20 degrees from the vertical" to a close with the remark that possibly the opposing viewpoints in this discussion are somewhat misled by the absence of a definition of terms.

May we suggest that perhaps Mr. Baumer is thinking of the relation of the aperture to the projector, while Mr. Mellinger apparently is thinking of the relation of the aperture to the screen. With this opening, we expect to have the controversy drag on indefinitely.

Synchronous Motor Control

(*Continued from page* 17)

As the current in this winding increases the magnetic flux in the two outer branches increase to a point of saturation and the impedance decreases.

The torque of the motor varies inversely with the resistance of coils L_1 and L_2, and as a result the greater the D. C. flowing into the coil G, the higher will be the torque of the motor.

The Bridge Circuit

A vacuum tube circuit connects the bridge circuit to the three-legged inductance. As the speed tends to fall this tube causes more current to flow. The complete circuit consists of four tubes: (1) detector, (2) rectifier, supplying D. C. for the alternator field and the grid-bias for the other tubes, with (3 and 4) supplying current for the middle leg of the impedance coil.

Plate potential for V_4 comes from the alternator through the transformer, T_4, and its phase is fixed. Grid potential for this tube is from the bridge output circuit E, the phase of which shifts 180° as the alternator speed changes from below to above 1200 r.p.m.

Grid Potential Change

This 180° *shift changes the potential of the grid relative to that of the plate from negative to positive, and vice versa,* thereby causing relatively large current variations in the plate circuit, which includes the resistance, R. The current flowing through R causes a correspondingly large change in the grid potentials of the tubes V_1 and V_2, and thus in the direct current to the impedance coil.

To overcome the fluctuations in speed which would naturally occur due to the large variations in current through the impedance coil, and due also to line voltage variations, a number of resistances together with a capacity are used. The resistances are R_2, R_3, and R_4; the capacity is C_2. Current flowing in the plate circuit of V_1 and V_2 to coil G flows also through R_2 and R_3.

The drop across C_2, which after a short preliminary period is the same as that through R_2, feeds back a potential to the grid circuit of V_4 and thereby causes the additional required regulation.

To slow down the action of the feed-back, R_4 is in series with C_2 and across R_2. The feed-back potential is that across C_2, and this rises or falls slowly, as the condensers must be charged or discharged through the high resistance R_4.

Sound Big in Canada

Another indication of the way sound pictures have taken hold in Canada is given in the news from Manager Nolan of the Avalon Theatre in Ottawa that daily matinees will be the regular thing in future at this theatre which heretofore has had only Saturday matinees.

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S. M. P. E. Spring Meeting in N. Y.

THE Spring meeting of the Society of Motion Picture Engineers will be held in New York City, May 6th to 9th, and the official headquarters will be the Park Central Hotel. Heretofore the meetings have been held in Boston, Washington, Norfolk, Virginia, Lake Placid, Hollywood, Rochester, etc., which were difficult for some members to reach and, to some extent, limited attendance. The meeting of the Society of Motion Picture Engineers have been uniformally successful, but the one to be held in May will undoubtedly be the largest ever held by the society.

While it is true that there has been a gradual growth of interest in the technical departments of the Motion Picture Industry, the introduction of sound has undoubtedly greatly increased the realization of their importance. It is too early yet to announce even the tentative plans of the spring meeting, but the personnel of the Convention Committee will convey some idea of the preparations being made.

Convention Committee

W. C. Kunzmann, National Carbon Company, is Chairman of the Convention Committee which is as follows: Reception: W. C. Hubbard, H. T. Cowling, M. W. Palmer, W. C. Kunzmann; Registration: Kenneth Hickman, W. C. Kunzmann; Hostess: Mrs. L. C. Porter (assisted by Mrs. Palmer); Banquet: W. C. Hubbard; Master of Ceremonies Banquet: J. I. Crabtree; Sound Equipment: R. V. Terry, Bell Telephone Laboratories; Projection: Harry Rubin, Publix Theatres; Entertainment & Amusements: M. W. Palmer; Bulletins and Transportation: A. N. Goldsmith; Press: P. A. McGuire; Official Photographers: H. T. Cowling, Irl Gordon; Announcements: C. E. Milliken.

J. W. Coffman, Chairman of the Papers Committee, in the near future will issue a preliminary list of papers to be read at the spring meeting, and announcements regarding the social program will also be made at the earliest possible date.

Many Interesting Papers

Below is a partial list of the papers tentatively scheduled for presentation at the Society meeting:

The Universal-base Sound-film Projector —Mr. H. Pfaunenstiehl, of Bell Laboratories, Inc.

A New Screen for Sound Film Presentation—"Da-Tone" Screen Company.

Re-recording—Its Importance and Its Problems—K. F. Morgan, Electrical Research Products, Inc., Hollywood division.

The Universal Camera Crane—Paper and illustrative motion pictures—Universal Film Company.

Sound-proofing the Camera—Roy Hunt, P. F. L. West Coast.

A Typical Sound Studio Recording Installation—Electrical Research Products, Inc.

Volume Levels in Theatres—H. B. Santee, Electrical Research Products, Inc.

Some Typical Problems in Process Photography, illustrated by film—Carroll Dunning.

The Camera Battery—Karl Strauss.

Public Announcement and Reinforcement Systems for Theatres—Electrical Research Products, Inc.

Sound-film direction—William DeMille.

Television Demonstration—Dr. Ives, Bell Laboratories.

Lighting Equipment for Sound Photography—Peter Mole.

Improvements in Incandescent Lamp Manufacture—Mr. Farnham.

Technique of Sound Film Editing—Hal Kern, United Artist, Editor-in-Chief.

Patent Problems in Business—F. T. Woodward, Electrical Research Products, Inc.

Characteristics of Emulsion Used for Recording—Emory Huse, Eastman Kodak Company.

Sound-film Sensitometry—A. K. Aster, Bell Telephone Laboratories.

Developing Developments—Joe W. Coffman.

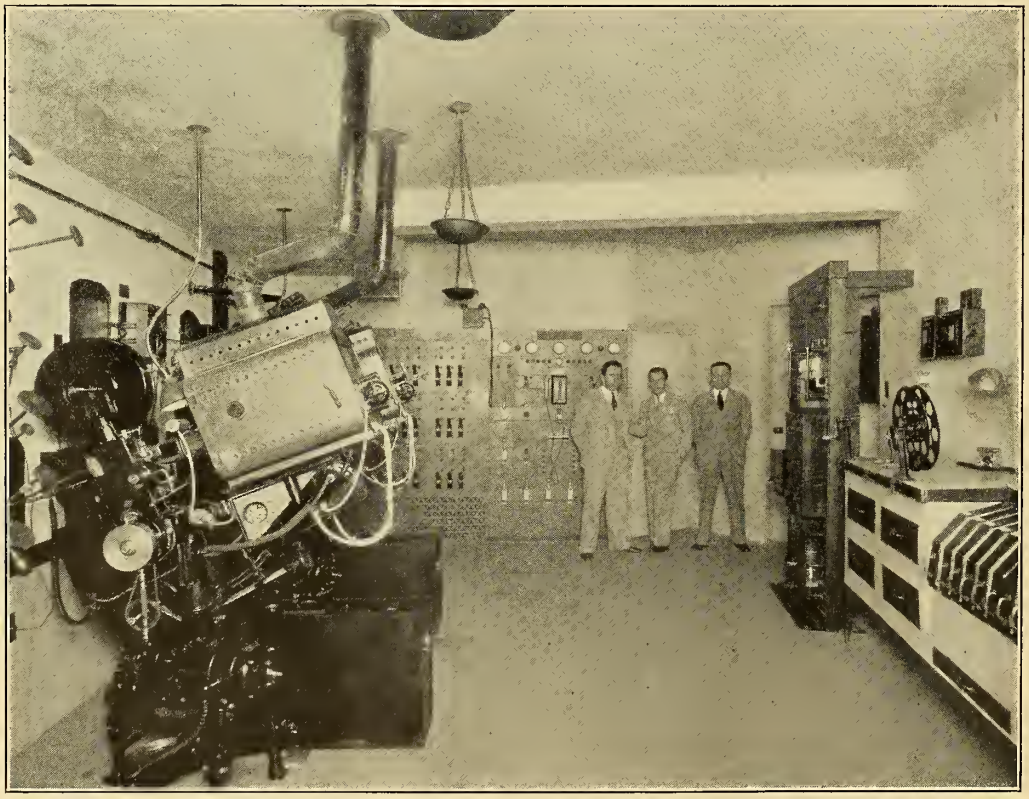
"Maltese Cross" Known and Used in 1864

A recent contributor to these columns mentioned the fact that the intermittent movement is sometimes called the "Geneva Movement" or the "Maltese Cross." It was stated at that time that the latter term was derived from the fact that it bore strong resemblance to the Maltese Cross of the Order of the Knights of Malta. This explanation is correct, so far as it goes, but there is other interesting information about the early applications of this movement.

It is known that this movement is not a new invention, but how many are aware that it was first employed in the manufacture of certain toys as far back as 1864? A little later it began to find favor with technicians, as, for instance, when it was used by a A. B. Brown for a machine which is regarded as the forerunner of the modern projector.

This machine of Brown's was patented in 1869 at the German Patent Office as patent number 93594. Brown's machine employed a ten-to-one movement.

The application of this movement to projectors found favor in America in 1894.

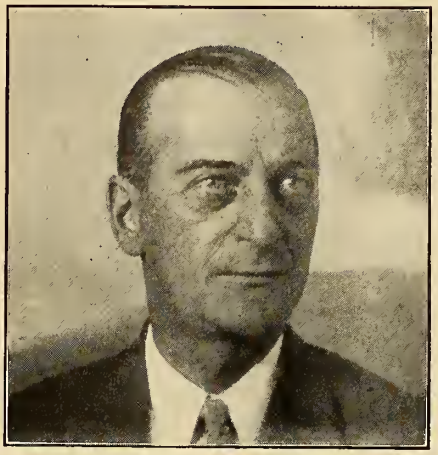


A view of the projection room of the Carthay Circle Theatre in Los Angeles, Calif. This room is a splendid example of well-planned and carefully maintained modern projection quarters. Note switchboard at far end, spot at extreme left, sound installation rewind table and reel cabinets. A splendid room.

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Over 135 Illustrations

Mr. Rudolph Miehling is a nationally-known figure in the world of projection.

He is a graduate of Columbia University, holding an engineer's degree. Prior to his entrance into the motion picture industry he was on the staff of several of the country's most famous electrical engineering corporations. For years before sound became a commercial fact, he fought for the realization of sound with pictures and made many experiments to prove his contentions.

With the formation of the Electrical Research Products Corporation, (Erpi) he was made Chief Installation Engineer, his knowledge of the practical requirements of projection making him one of the most valuable members of the staff of this company. He was taken away from Erpi by Publix as soon as this company decided to go into sound and appointed Advisor on Sound Projection for the Publix Circuit with the whole country as his laboratory. He has the respect of the whole sound picture world.

Mr. Miehling has written this book from the viewpoint of a practical projectionist.

He describes all existing sound systems with wiring hookups, methods of operation, etc.

He gives full details of amplification, recording and projecting under all conditions in all kinds of theatres.

He lists all the common problems of sound projection and gives careful instructions on how to overcome them.

He lists over 100 illustrations showing details of each system, getting at the insides of them, to enable the projectionist to better understand his equipment.

Partial List of Chapters:

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Local 650, Westchester, N. Y.

MARCH 11th last marked the Second Anniversary of Local 650, and the occasion was fittingly observed by a dinner at the Lawrence Inn in Mamaroneck, N. Y. The affair got under way shortly before midnight, and the party continued until well after 5 A. M.

Among the many guests present were Mayor Berg of Mount Vernon (N. Y.), Hon. Judge Coffee, also of Mount Vernon; Alderman Murray of Yonkers, Simon Terr, B. A. of Local 306 (N. Y. City), and Joseph Downing, who acted as toastmaster.

"Martens Night" appeared on the invitations to the dinner in recognition of the services rendered by Brother Martens who has been B. A. of Local 650 since its organization. Brother Martens was presented with a purse of gold by his many admirers, many contributions to the purse being received from without Local 650 ranks. Brother Martens offered his thanks between blushes of deep red.



Arthur Martens, B. A. of Local 650

Heading the Committee on Arrangements for the affair was Brother Richard Hayes, who was assisted by Brothers Weiss, Shappack, McDonald, Allbee, Sabitino, and your humble correspondent. —F. W. McCLAIN.

Cameramen Increase Fee

Cameramen's Local Union 659, a unit of the I. A. T. S. E. which is rapidly forging ahead these days, has raised its initiation fees from $250 to $500, effective May 1st next. This Local Union has been very active within the past year, and its membership has been rising steadily.

It is interesting to note that in November, 1926, the initiation fee for this unit was less than $5.

348 Talkers This Year

Coast studios will produce approximately 348 sound pictures this coming year, according to estimates made on issuance of production charts. Many of these pictures will also be available in silent prints.

Vallen Sound Mask Insures Perfect Reproduction

The problem of proper screen surface reduction is enormously simplified by the introduction by the Vallen Electrical Co. of Akron, Ohio, of the Vallen Automatic Mask. This new Vallen product insures exact size on all screen surface reduction, and it provides a safe and certain way of overcoming screen difficulties caused by the introduction of sound pictures.

The Vallen Mask is simple yet positive in its action, and it may be either hand-operated or remote-controlled electrically. The Vallen Mask has only just been announced, yet Mr. E. J. Vallen announces that he is being deluged with requests for the masks from projectionists all over the country.

Usual Vallen Guarantee

The usual Vallen guarantee of quality, workmanship and performance which has heretofore been given on the Vallen Curtain Control and all-steel Safety Track is also applied to the new Vallen Mask, insuring positive results and durability.

J. L. Cathro is the New York representative for this new Vallen product with headquarters at the Laurelton Hotel, 147 West 55th St. The general Eastern representative is M. B. Berger.

Radiophone to Planes

After months of painstaking experimentation by pilots and engineers of the Boeing Air Transport system and specialists assigned to the task by the Bell Telephone Laboratories of the Western Electric Company, radio telephony to and from airplanes in flight has been perfected to a point where a network of ground stations linking Chicago and San Francisco is now being completed, and the new communications. With its inauguration, engineers say, Boeing pilots will be kept in closer contact with operations headquarters than train crews, whose only instructions are visual signals and orders received at stops.

Not only will the flyers have the benefit of continuous verbal touch with one of the eleven ground stations stretching across seven States on the 2,000-mile airway but they will receive through the same radio equipment directional signals from radio beacons established every 200 miles by the Department of Commerce and weather information broadcast by the same agency.

Underwriters Studying Sound

The National Fire Protective Association is understood to be studying carefully the new problems raised in connection with the installation of sound picture equipment in theatres. The matter has been referred to a special sub-committee of the national electrical code committee.

High voltage used in sound systems are causing much concern to the underwriters, but as yet no set standards are in effect. A meeting to consider the various phases of sound pictures is scheduled for the near future.

The *difference* in projection lenses *may be measured in the box office till*

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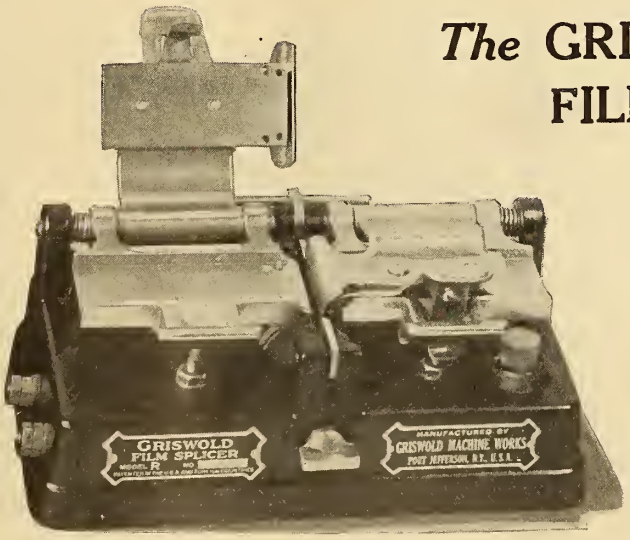
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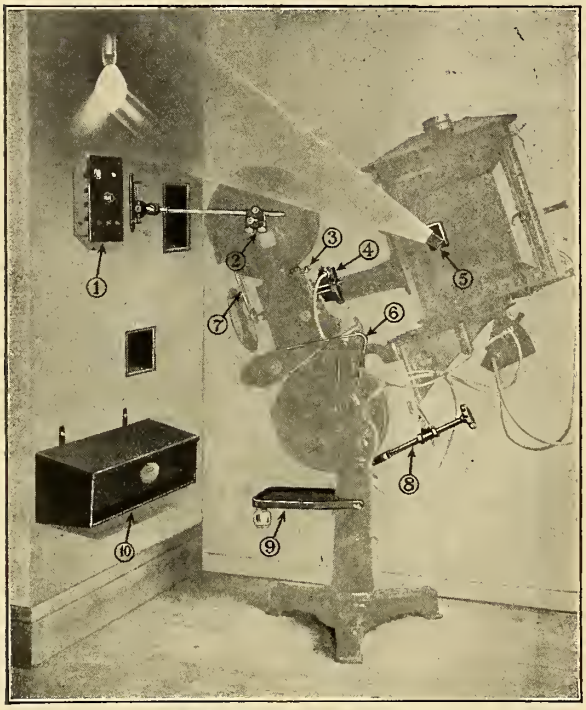
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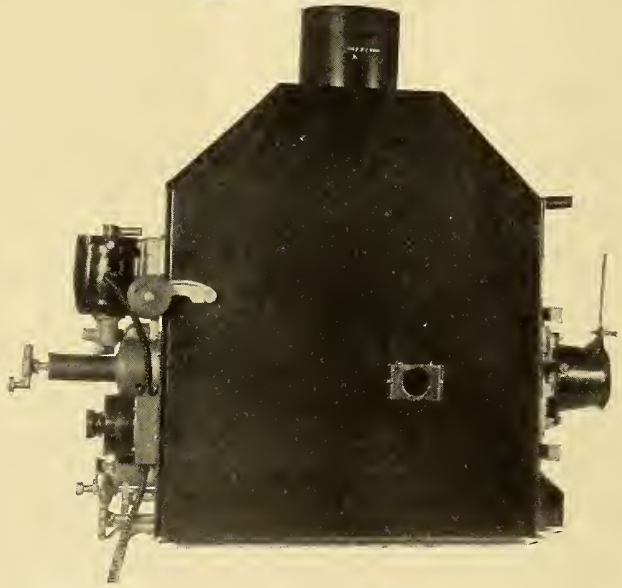
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Motiograph Shutter Wins Favor

SINCE its introduction several months ago, considerable comment and discussion among projectionists has been heard regarding the new horizontal, cylindrical shutter of this new projector. This is undoubtedly an evidence of a growing popularity and preference for this type of shutter since it is now known that the new Model "H" Motiograph De Luxe projector is a highly efficient machine, its most outstanding claim being the elimination of the destructive heat from the film.

This shutter presents many interesting points in shutter construction and design that are entirely different from the usual rotating disc-type of shutter. The first most noticeable difference is the formation of the shutter. This is of horizontal, cylindrical formation and from which the shutter is referred to as a "horizontal, cylindrical shutter." The engineers inform us that this form was not the result of an accident or an attempt merely to provide a shutter that looked different. Quite the reverse is true in that each blade, opening, angle and position was scientifically worked out to accomplish the definite purposes for which the shutter was intended.

Double "Quick Cut-off"

By rotating the shutter on a horizontal axis it made possible the double "quick cut-off" action of the shutter blades which cut the light beam simultaneously from the top and bottom and across the narrow dimension of the aperture. Just a little thoughtful consideration will make clear the point that, by intercepting the light beam from the bottom and top at the same time and across the narrow dimension of the aperture, a much more efficient cut-off action is accomplished in contrast to the rotating disc type of shutter, which cuts off from the top to the bottom of the light beam and in a manner nearly diagonally across the aperture. This efficiency of cut-off alone tends to increase the amount of light reaching the screen.

The proportion of the cut-off blades is another feature. Proportionately they total much less than the amount of opening in the shutter. We all know that in the most efficient type of rotating disc shutter the proportion of the cut-off blades is always greater than the amount of light openings, therefore, it seems that the claims for greater light efficiency of the new shutter are well-founded.

However, aside from the claims for greater light efficiency, the horizontal cylin-

Sound-on-Film vs. Discs

While Paramount has definitely aligned itself with that faction which favors sound-on-film recordings exclusively, Universal Pictures Corp. announced recently that it considered the disc system to have some very definite advantages which merited a continuance of its use. Most of the opposition to the disc system is based on the fact that the overhead on breakage is so large and that the sound-on-film method permits easier handling of prints.

drical formation of the shutter offered a design that permitted what might be termed a *blended cut-off action,* and one which would result in a more flickerless cut-off section. This it is explained, is accomplished by it being possible for one of the cut-off blades to intercept the light beam near the aperture (or focal plane), while the other blade at the same time is intercepting the light beam at another point further away from the focal plane.

Elimination of Heat

The feature of eliminating the heat from the film is of course accomplished primarily by positioning the shutter between the film and the light source. Here again the manufacturers have been able to make further gains over that secured by the simple procedure of placing an old type rotating disc shutter between the light source and the film, and here again the horizontal, cylindrical formation of the shutter makes possible this added efficiency.

Cooling Feature

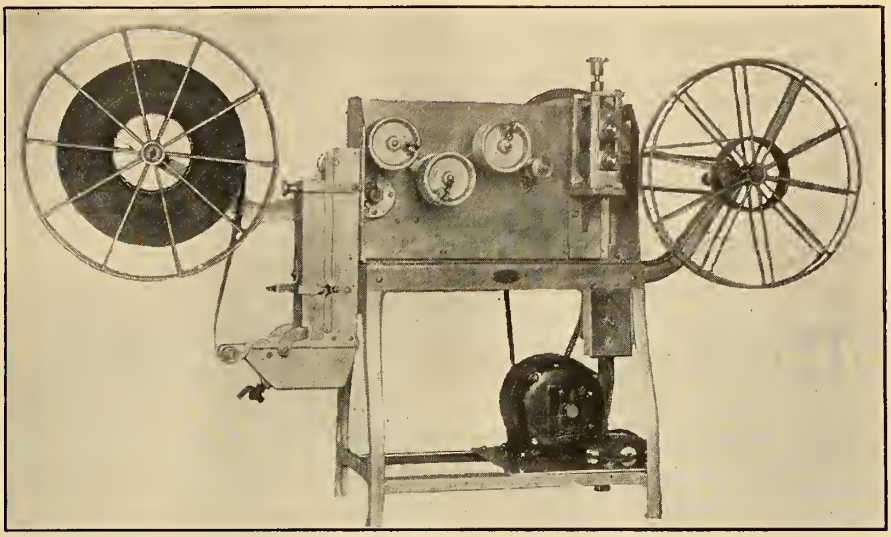
The ends of the shutter casting are shaped like the blades of a fan and the surfaces of these "fan ends" are angled to perform just the same function as those of a fan. The shutter itself is enclosed in a housing which is so designed in conjunction with the shutter that during the rotating of the shutter, air currents are generated which draw cool air over the film and between the cooling plates and the shutter housing in such a way that a continual forced air circulation is obtained which not only materially aids in cooling the film itself but as well cools the gate door, film shoes and tension springs and the aperture. The cooling of these latter parts of the projector in these days of intensely hot light sources is of distinct convenience to the projectionist.

The shutter is an aluminum casting and is very carefully machined and balanced, with ample-sized ball bearings on which it rotates and the generous sized driving gear. The construction of such a shutter is without doubt more costly than that of the rotating disc type, however the advantages obtained more than justify this added cost.

Improved Picture

One must consider that the improvement in projection which is secured through eliminating the heat from the film and allowing the film therefore to pass through the projector in a perfect flat focal plane, from which the objective lens is able to deliver to the screen a projected image with all the richness of the photography unimpaired and the full corrections of the lens utilized, is alone worth all the effort and cost of producing a shutter of this type and a projector in keeping with it.

Improvements in projection and in projection equipment have been noticeably evident during the past year and unquestionably this new type shutter which so efficiently eliminates the heating, buckling, and warping of film and which improves projection, is one of the marks of progress.



Mr. Projectionist! Your manager and the public depend upon you! It is your responsibility to see that you have a clear and perfect picture on the screen. It is up to you to see that all causes of eyestrain, such as flickering, rainy and cloudy effects are eliminated!

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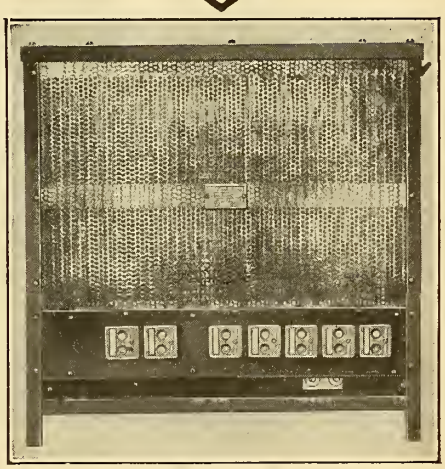
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Changeovers Causing Trouble Throughout Country

IT was expected that with the advent of sound pictures, not to mention the constant stressing of the necessity for keeping the film free from mutilation and the wide publicity given the need for careful handling of sound film, that the old changeover mark nuisance would be a thing of the past, or at least occur so seldom as to indicate that the craft at large had determined to rid itself of one of its prize bugaboos.

But not so. For the number of complaints on the score of damaged film resulting from careless handling by projectionists has grown instead of decreasing. From every section of the country come complaints of the marking, punching and scratching of film, with or without sound accompaniment.

Mutilating silent film was bad enough and did enough to bring the craft into disfavor; but now that sound film is being treated with equal, if not more, carelessness, the problem has become acute. It would not be fair to say that all projectionists engage in these shiftless tactics, for a goodly portion of the complaints are from projectionists themselves who have to use film after it has been abused on a prior run. As an indication that many, many projectionists are earnestly trying to better film conditions this news is cheering; but it is unlikely that cheering news alone will suffice to curb the activities of those who continue to project in the 1910 manner.

Trick "Conferences"

Often the matter of introducing to the industry a compulsory standardization for changeovers, has come up for consideration, with the slightest deviation from the standard agreed upon to be followed by summary penalizing in one form or another. In all instances such proposals were short-lived and were speedily forgotten after the end of this, that or the other conference.

One of our correspondents states that several times lately he received film in such poor condition that it was impossible to run it under any circumstances. It is too bad to have to admit that often projectionists are forced to "nurse" a poor print along through several performances simply because the show must go on. On the other hand, the forced cancellation of a few programs, with the consequent loss of revenue at the box office, would seem to be about the only method left through which to awaken the sleeping beauty producers and exhibitors to the necessity for facing and dealing with this important problem at once.

Local Unions Must Cooperate

Those projectionists who have their own pet "gadgets" for changing over are, in the main, men who have cast about for a safe method of changing over without having to mutilate the film. These men are not the group from whom damaged film may be expected. Rather is it the lazy, incompetent projectionist who must be so restricted by set rules, that his mutilating

English Comment On Advisory Council

(From *The Bioscope*)

WE suggested a few weeks ago that the time was arriving when something in the nature of an organization of cinematograph projectionists would be necessary for the purpose of keeping our projection-room technicians well informed as to the latest developments in the industry. That suggestion has provoked a considerable amount of support, and we may return to it in the near future.

In the meantime, it is interesting to see what is being done in this direction in America. A Projection Advisory Council has been formed there with an imposing board of directors and a valuable list of competent sub-committees. The slogan of the Council is "Progress Through Understanding," and the Council aims at developing a better realization of the importance of good projection and at assisting all activities seeking to improve projection conditions.

The plans are quite simple and workable and have received the strong endorsement of Government and Municipal departments, large industrial and commercial organizations, engineering and projection societies and many of America's best-known projectionists.

Well-Balanced Personnel

In the list of Directors and Chairmen of Committees are included manufacturers, business men, lawyers, a number of state legislators, graduates of well-known colleges and officials of various organizations. They are all ambitious progressive men who have given much of their time for the advancement of the motion picture industry. The projectionist will be aided in every way to secure all possible theoretical and practical information regarding his work. A knowledge of the activities of all similar societies working for the advancement of projection is essential and these organizations will have approval and co-operation.

proclivities may once and for all time be banished.

The possibility of dealing properly with this situation seems very remote if co-operation is not had from every Local Union in enforcing whatever method seems best applicable to the problem—that is, enforcing the right of their members to absolutely refuse to run poor film as well as executing the proper penalty upon any man who is responsible for mutilation.

Waiting for assistance from the owner or manager, or the producer, has been tried not wisely but too long, and it is time that pressure be applied from another source. The power to push such sorely needed reforms lies in the individual Local Unions acting in concert and insisting upon the right of their men to be given every opportunity to put on the best possible show, no less than the right of every theatre-goer to get full entertainment value for the cash he puts down at the box office.—

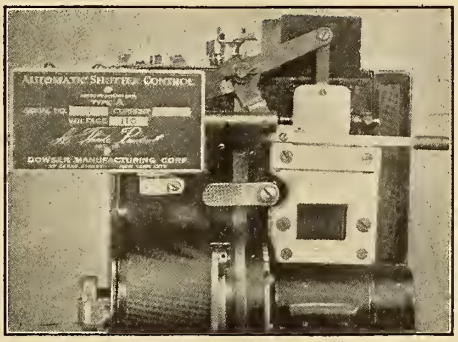
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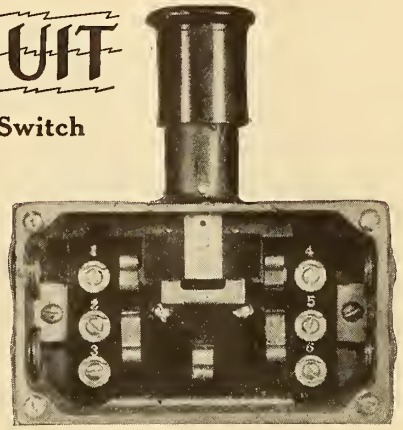
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Most of you are already the owners of F. H. Richardson's 5th Edition HANDBOOK OF PROJECTION, in two volumes.

A companion book to this edition in the form of Volume III dealing completely with the new subject of Sound Recording and Reproduction is now in preparation and will be ready for publication on June 1st.

Publication is being purposely delayed until that time in order to include certain very important technical data on new equipment which the manufacturer will not be ready to release until then.

There is no use in publishing a book on Sound Projection that is not complete and up-to-date. That is why we are purposely delaying publication—and no projectionist will regret that delay when he sees Volume III.

It will be bound the same as Volume I and II. For this reason every present owner of Richardson's 5th Edition will want the new Volume III to match up and complete his projection library.

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Local No. 623 Thanks Alliance for Aid

THE following communication from the membership of Local Union No. 623, of West Palm Beach, Florida, was received recently at the office of the International Alliance and was published in the last issue of the General Bulletin, No. 237. The members of Local Union No. 623 are deeply grateful for the aid extended them by their brothers throughout the Alliance, and they wish the widest possible publicity given their letter of appreciation. The letter follows:

To the Officers and Members of All Affiliated Locals of the I. A. T. S. E. & M. P. M. O. of the U. S. & C.

Greetings:

On September 16th, 1928, one of the worst hurricanes ever recorded swept through and laid low the City of West Palm Beach, Fla., leaving in its wake a path of destruction that exacted a toll of 3,000 lives and made homeless thousands of families.

Among the victims of the storm was one of the smaller locals of the I. A. T. S. E,. Local No. 623. Though escaping any casualties, their homes were ruined and their theaters destroyed.

President Canavan, in answer to our plea for assistance, issued an appeal for financial aid for our stricken brothers. The manner in which the appeal was answered can be only shown in the report published in the Bulletin. Donations ranging from 90 cents to $200.00 were made, and promptly at that, even in the face of contractural troubles.

Words cannot possibly describe our gratitude for the response. We are deeply appreciative of the spirit shown and of the substantial manner in which it was done. The funds put the members on their feet until work at our craft opened up, and they also restored many of the storm-damaged personal articles of necessity.

We thank you from the bottom of our hearts—We are Grateful—and in retaliation, we can only say this—that should this little local ever be called upon to aid a sister local in distress you will not find us wanting.

We wish you all the prosperity and good luck possible.

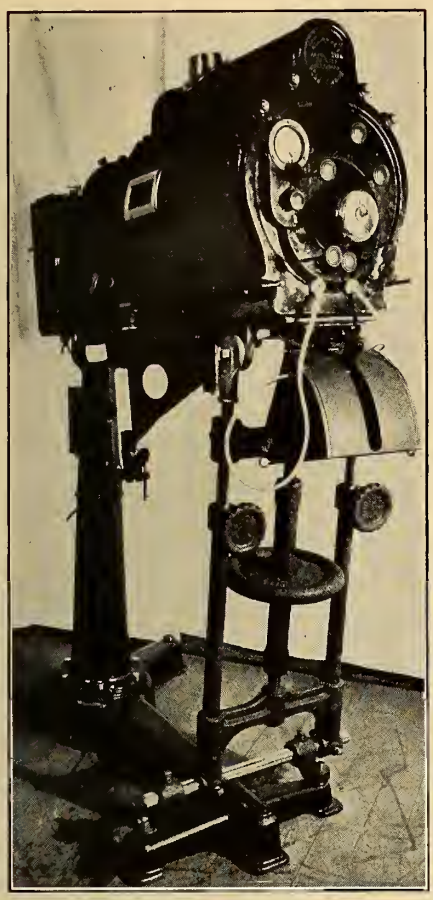
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It is an absolute necessity to keep the sound track clean in order to get satisfactory reproduction. When the track is not cleaned regularly dirt accumulates thereon which may cause serious trouble and which does give poor quality sound. The proper way is to clean the track after every run. Casual inspection will not suffice.

Cinephone Disc System

Powers Cinephone will be ready shortly to offer its disc-reproducing attachment as a supplement to its sound-on-film apparatus, and its non-synchronous outfit. Exhibitors have the choice of buying any one or all of these attachments. A dual outfit, disc and film, is priced at $6,000 complete.



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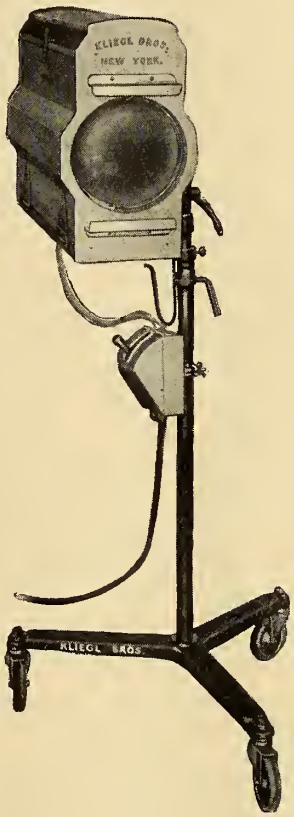
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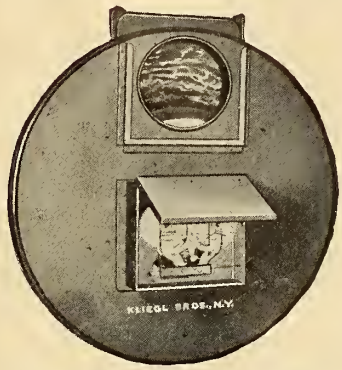
The spotlight is flexibly mounted on a telescopic pedesdal stand, and it can be set at any angle, raised, lowered, or turned



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The lamp housing is 22″ long, is light-tight, thoroughly ventilated and substantially constructed—with framework of cast aluminum and sides of rust-resisting Russian iron. It is equipped with: an 8″ condensing lens—so supported as to allow unrestricted expansion of the glass to avoid breakage; a mogul-screwbase receptacle, mounted on a sliding base, with a vertical adjustment for centering the light source, and a rod, extending through the rear of the housing for focusing; a concave chromium-plated reflector mounted back of the lamp to insure full utilization of the light source and to intensify the beam; a large, self-closing spring door on one side of the hood which permits easy access to the interior; and slide grooves on front of hood for holding iris shut. Spot is furnished complete with telescopic stand, asbestos leads, enclosed switch and 25′ of stage cable.

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THE Roth Actodector is a multiple-type motor generator designed to supply direct current at the proper voltage for the operation of projection arcs in theatres where only alternating current is available. The multiple-type generator principle as pioneered by Roth in the Actodector has practically superseded the series-type and is universally recognized by projection engineers as fully meeting the diversified requirements of the modern projection room.

Because of the automatically maintained and practically constant voltage, the projectionist finds his work considerably simplified. Once the rheostat adjustment has been made, no further adjustment is required. The second arc may be struck and the changeover made without a flicker. There is no arc stealing, the Actodector automatically furnishing the proper amperage to all arcs.

Either a single ballast resistor for each arc or a double-ballast resistor, taking care of two arcs, is employed in series with the lights. Actodectors are furnished to operate from any commercial power supply and are made in a range of sizes to meet the requirements of any theatre from the smallest house using one machine to the deluxe houses employing several projection machines, spots, dissolvers and effect apparatus.

Simplicity of Operation

A popular feature of the Actodector is its simplicity of operation. Once the rheostat has been set, it delivers a steady voltage without further attention. This is true, regardless of the number of arcs brought into play as long as the amperage consumed is within the rated range of the machine.

During the changeover, a period when the projectionist is particularly busy, the simplicity of its operation is particularly in evidence. To strike a second arc, it is only necessary to close the switch and bring the carbons together momentarily.

No rheostat adjustment is required and he can devote his entire attention to the machine and screen. The Actodector automatically furnishes the required current without affecting the operation of the first arc in the least. Not a flicker is visible. To shut off the first arc, it is merely necessary to pull the switch. Again no adjustment is necessary and the operation of second arc is entirely unaffected. This feature is particularly valuable in producing effects allowing any number of arcs within the range of the machine to be used and permitting the shutting off or throwing on of arcs without a flicker.

The Actodector instantly and automatically supplies the amperage required without variation in the voltage. This is accomplished without movable regulating devices and without moving the brushes. The set is wound to supply a fixed voltage from no load to full load and after the rheostats have been set to deliver the required voltage, it operates without attention under all normal conditions. Thus the projectionist is left to give his entire attention to the business of projection.

Variety of Models

Actodectors are furnished to operate from any commercial power supply and the size range from 30 amperes to 450 amperes, meets the demands of any theatre from the small one machine house to the big deluxe houses using elaborate effects. They are rated on the continuous amperage rating. The second rating represents the maximum output which they will deliver for a period of fifteen minutes without difficulty.

To the projectionist who takes his work seriously, considers it as he should, an art, the unmistakably better projection afforded by the direct current arc needs no elaboration. He is undobutedly, also familiar with the economy of this method. The Roth Actodector is designed to convert the normal alternating current supply to direct current for D.C. arc operation.

Compact Design

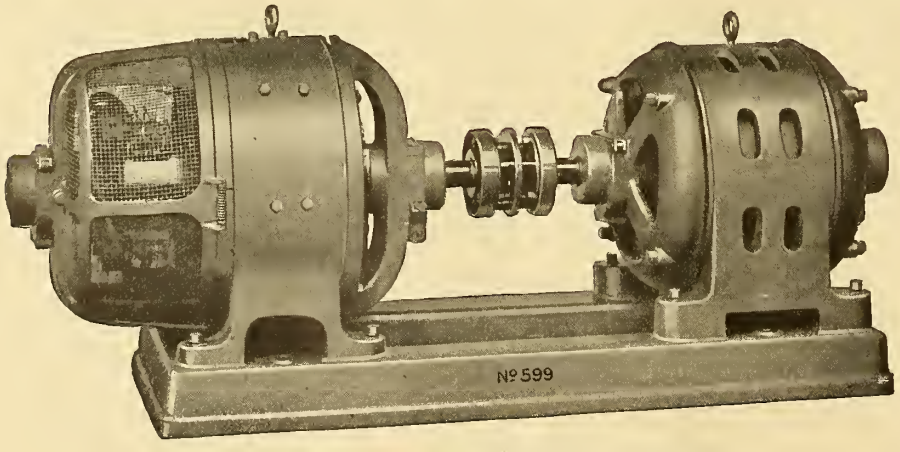
Its primary advantages find their source in the fact that it is not an adaptation of an ordinary motor generator to this service, but is designed especially to meet the requirements of projection work delivering a constant direct current supply at the voltage best suited to arc operation.

The smaller sizes—up to 150 amperes—deliver their output at 70 volts, the voltage best suited to reflector type arcs. (This is the lowest voltage multiple type generator on the market). Eighty-five volt types are supplied for high intensity arc operation and 100 volt types for special purposes.

Being built especially for projection work, Actodectors are designed as compactly as possible to meet the crowded conditions often found in the booths of older houses. The smallest occupies a floor space 14 by 28 inches and is 13 inches high, while the largest is but 25 x 82 x 29 inches.

Realizing that the motor-generator becomes the heart of the projection room and that the entire business of the house depends upon its faithful performance, the manufacturers have expended every effort to make it as simple, trouble-free, accessible and easy to maintain as possible. Aside from occasional lubrication and renewal of the brushes, it seldom requires any attention. The commutator and brush rigging is the most accessible to be found in any motor generator set now on the market. The bearings too are easy to get at and are standard sizes to assure easy, prompt replacements.

A special type of flexible coupling is employed on the four-bearing machines to prevent misalignment, frictional resistance, back lash, rattle or hammer action.



View of Roth Actodector, showing sturdy construction

Mutilated Film Still Presents a Serious Problem

Editor, M. P. PROJECTIONIST:

I have been following the articles on bad film in the columns of THE MOTION PICTURE PROJECTIONIST with considerable interest. After reading Mr. Baumer's letter in the March issue, I decided to send you several samples of a print sent to me recently by the Minneapolis exchange of one of the leading film producers.

My action in removing these clips from the picture was wholly justified, I think, on the score that they will serve a much better purpose as illustrations of "artistic work" being done by men in this locality, as everywhere else, than they would if permitted to remain in the print and peform the function of serving as changeover cues.

Exchanges at Fault

However, it must not be thought that the blame for all bad film is due the projectionist. Another common and very good reason for complaint is the "competent" inspection work now being performed by the exchanges. To every one of us the accompanying splice is familiar. (Note: The sample submitted consisted of a dozen feet of film, the emulsion of which had been scraped clean, and which included a splice which could not possibly pass through the aperture.)

It is not reasonably possible that such film could have passed through the mechanism. But since we fellows are the ones who have to suffer the consequences of a break—a fire—the exchanges care little. A break, the hurried re-threading of a hot machine—maybe a serious fire—all to the accompaniment of handclapping and whistles

Hints on Battery Care

IN operating storage batteries, a few points should be understood as to their care. If these few simple directions are followed, long life will be obtained from the battery and battery troubles will be eliminated. The principal points to be kept in mind are as follows:

Keep the Outside of the Battery Clean and Dry

Dampness and dirt permit the electric current to leak away and leakage may cause noise in the amplifiers. In time, wood battery cases will become rotted and the terminals become corroded.

Keep the vent plugs, (see figure 6), in place at all times, except when taking a specific gravity reading or when adding water.

If acid is spilled or the battery is damp with acid, apply a small amount of a dilute solution of ammonia or baking soda and water, which will neutralize the acid. Then rinse the battery with water, and dry. Do not allow this ammonia or soda solution to get into the battery cells.

Keep Terminals Clean and Tight

Sometimes a deposit will form on the terminals of the battery. Remove this with weak ammonia or soda solution and scrape the metal clean. Then cover the terminals with a thin coating of vaseline to prevent further corrosion. Keep all terminals tight, as a single poor connection may result in much amplifier noise.

Add Water to the Cells Regularly

The water in many cities is satisfactory for adding to the battery. However, use distilled water if there is any doubt. Never allow the surface of the electrolyte to drop below the tops of the plates. Add water when needed until the level of the electrolyte in rubber jar cells is just below the bottom of the filling tube. In glass jar cells, fill to the water line.

To let the electrolyte fall below the tops of the plates allows just that much of the plates to dry out. That part of the plates which has been allowed to become dry becomes inactive in the chemical reaction. In other words, the capacity of the battery will be reduced in proportion to the amount of plate surface which has been allowed to dry out. It can be converted into active plate surface again only through elaborate treatment. There is also a permanent deterioration of that part of the plates which has dried out.

Add water just before charging. This allows the water to mix thoroughly with the electrolyte during the charge, as there is always some bubbling or gasing during charge. Do not add water just before or during use in a show.

Keep Terminals Clean and Tight

It is very important that all open flames be kept away from the battery, particularly while charging. Use an electric flash light. Hydrogen gas is given off by the battery in charging and certain mixtures of hydrogen gas and air are highly explosive.

Make Readings Carefully

In taking specific gravity readings with a hydrometer syringe there are a few points to keep in mind. Draw into the syringe sufficient electrolyte to float the hydrometer in the syringe clear of the soft rubber stopper in the bottom, but do not draw in enough electrolyte to allow the stem of the hydrometer to touch the top of the syringe. Release all pressure on the rubber bulb when reading. If the level of the electrolyte is too low to obtain sufficient electrolyte to float the hydrometer bulb, add water to the battery, but do not take a specific gravity reading until this water has been mixed by charging.

Avoid Over-Discharging

It was explained that on discharge, lead sulphate was formed in both positive and negative plates. Lead sulphate occupies more volume than either the lead peroxide of the charged positive plates or the pure lead of the negative plates. Provision has been made in the plates for taking care of a certain amount of this expansion. If, however, the discharge is carried too far, the plates will be permanently injured and their life shortened.

Do Not Let a Battery Remain in Discharged Condition

Lead sulphate, which is formed in both plates on discharge, hardens in the plates if allowed to stand in this condition for any length of time. If this lead sulphate becomes hard, it is difficult to drive the acid out of the plates and back into the electrolyte again by charging. This condition is what is commonly known as "Sulphated Battery."

Excessive Charging Rate

If the charging current is maintained too high, especially toward the end of the charge, there will be overheating, which may char the separators and injure the plates.

Do Not Over-Charge

Do not over-charge repeatedly. Continuing the charge, after a hydrometer reading shows that the battery is fully charged, will weaken the plate structure and in time will result in cracked positive plates. This results in decreased capacity and possible internal trouble from short circuit.

---

from the audience is as nothing compared with the convenience of the exchange inspectors. And this sample is only one of the many I have encountered lately. In one instance I found no less than 55 splices in one reel, all of which had to be remade before projecting.

I complained of this print to the manager, and he immediately got in touch with the exchange. Prints from that exchange have been uniformly good since that time—which ought to suggest similar courses of action to other projectionists.

Small Houses at Disadvantage

The fellow in the large house may not be seriously affected by such work, since they usually receive new prints, and their working schedules allow ample time for any corrections. However, the fellow in the small house never sees his show until 30 minutes before running time (sometimes even less), yet good projection is just as important to Mr. Little Theatre Owner as to the "big shots." And if anyone thinks the former does not care about projection, one is mistaken.

Let the exchanges first correct their own employes, and then, if the trouble still persists, look to the projectionist. Why we projectionists, as a craft, take such nonsense as the wholesale accusations by exchanges that we alone are responsible for bad film is beyond me. If the responsibility for good film were put up to us properly, action by the craft as a whole would be necessary. And this would be a good thing.

Your plan to supply the craft with constant education is commendable, as is your idea that the matter should be dealt with properly by the craft as a whole. Education is the one thing we can never have too much of, and I am sure it will never tire the man who is working honestly day by day to improve himself and his craft.

Deficient Equipment

In closing, I wish to say a few words about this matter of film speed. It is obvious that if the production was originally photographed at a given rate of speed it must be projected at the same speed, if the actors are to appear natural and if the ideas of the director are to be carried out. It is when a reasonable rate of speed—say 90 ft. a minute—is exceeded in projecting that the speed may really be termed "excessive."

Projection speed is *not* our greatest concern just at the moment. It would be better if we would agitate for the chance to run our shows with equipment that was up-to-date and capable of giving a good show. The boys are capable; but we certainly cannot be expected to give the proper results when we are asked to operate equipment that is old or faulty.

Dworsky Junior Cleaner

The Dworsky Film Machine Corp., 61 Sixth St., Long Island City, N. Y., has introduced a new Dworsky film cleaning machine which is known as the Junior Theatre Cleaner. This new machine does exactly the same work as the larger cleaner, the only difference being that its footage capacity is less.

Like all Dworsky film cleaning machines this new product is motor driven, which insures maximum efficiency in cleaning prints. A feature of the Junior model is the double-breaking attachment which permits control of the machine by either the hand or the knee.

Don't Scrape Emulsion

Emulsion should not be scraped off the sound gate. Scraping scratches the polished surface which easily again becomes coated with emulsion. The proper way to remove emulsion from the gate is to use a dampened cloth, which does not harm the surface.

Where to Buy Good Equipment

Notice to Projectionists

The Motion Picture Projectionist recommends all Dealers represented in this section. We urge you to support them at all times. Patronize them for new or used equipment of every description. If they haven't got what you want they'll get it for you.

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Complete "Sound" List

BELOW there appears an up-to-date list of synchronous reproducing devices for installation in motion picture theatres. Several of these devices have yet to make their first theatre installation, while others have but three or four units working. Many manufacturers who now have a disc system working are promising a sound-on-film attachment shortly, but it is an open secret that the majority of these will be unable to make good their promises because of their inability to overcome the many difficulties contingent upon the working out of a satisfactory optical system. The list follows:

Device	*Type*	*Attachment*
Bello-O-Tone	Disc (a)	None announced
Biophone	Disc (a)	Film; now available
Cinephone	Film (c)	Disc; ready very soon
DeForest Phonofilm	Film (c)	Disc (a) (b); about April 1
DeLuxe Masterphone	Disc (a) (b)	Film; ready soon
Dramaphone	Disc (a) (b)	Film; about April 1
Dulcetone	Disc (a)	None announced
Electrical Research Prod	Dual (a) (c)	
Filmtone	Disc (a) (b)	Film; ready soon
Gennett Hanaphone	Disc (a) (b)	None announced
Halgrophone	Disc (a)	None announced
Humaphone	Disc (a)	None announced
Ince-A-Phone	Disc (a) (b)	None announced
Kolstadphone	Disc (a)	Film; ready later
Melotone	Disc (a) (b)	Film; ready June
Moviephone	Sound-on-wire	
Movie-Phone	Disc (a) (b)	Film; now testing
Pacent	Disc (a)	Film; ready soon
Paratone	Disc (d)	None announced
Phonoscope	Disc (a) (b)	None planned
Phototone (Allied)	Disc (a) (b)	Film (c); ready May 1
Phototone (Platter)	Disc (a) (b)	Film (c); ready soon
R. C. A. Photophone	Film (c)	Disc (a); ready
Reeltone	Disc (a) (b)	Film; now testing
Simotone	Disc (d)	None announced
Slote Synchronizer	Disc (a)	None announced
Sonograph	Film (d)	None announced
Sonora-Bristolphone	Disc (a)	Film (c); about March 1
Synchrophone Corp.	Disc (a)	None announced
Talk-A-Phone	Disc (a) (b)	None announced
Telefilm	No data (d)	No data
Traveltone	Disc (a) (b)	Film attachment date uncertain
Vocafilm	Disc (a) (b)	Not decided

Note (a) Geared to play 33⅓ rpm records.
(b) Plays standard speed records.
(c) Uses 80 mills sound track.
(d) Details not available.

Sound Shorts Supplant Publix Presentations

PUBLIX THEATRES, INC., operators of a string of theatres throughout the country, is now supplanting its presentation programs with all-film programs. The elaborate stage shows which heretofore have been routed through the Publix circuit as regular units will not be produced in future, but will be succeeded by short subject films having sound accompaniment.

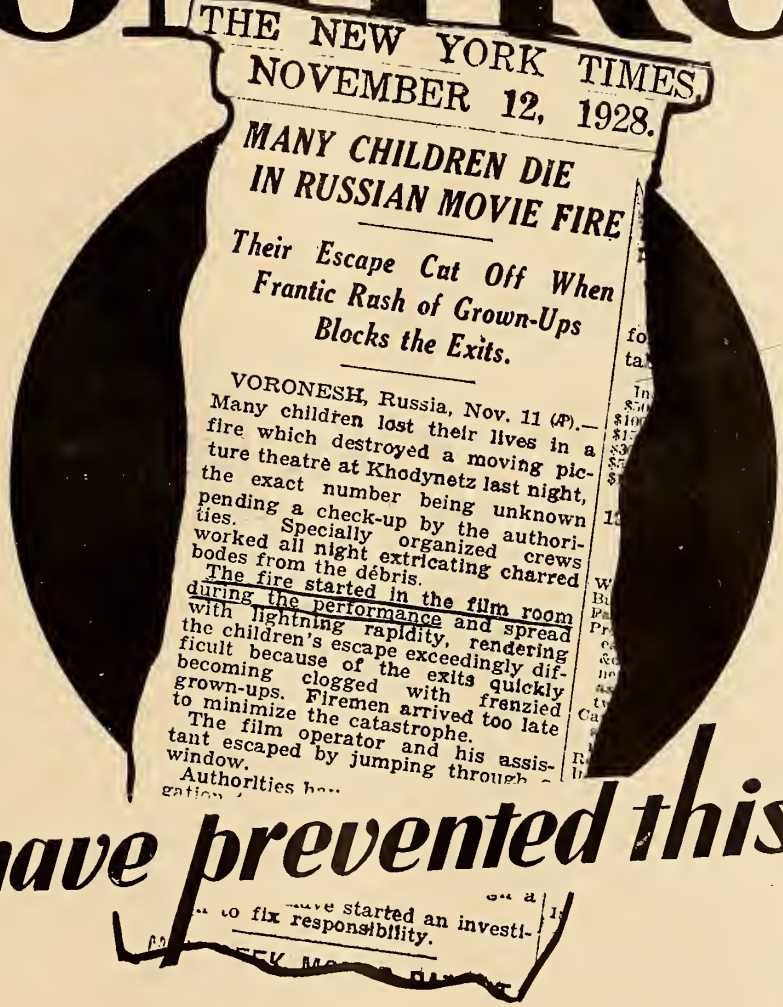
This radical change in Publix policy is the result of a series of experimental all-film programs which were offered at several of the company's West Coast houses. The response to this type of program was so hearty that the Publix executives decided to install it in all their houses. No more Publix presentation units will be formed for the road, and the houses affected by the switch will offer all-film programs.

This change in policy is all the more startling when it is considered that Sam Katz, president of the company, was the first to employ the presentation feature in de luxe theatres and has long been a strong advocate of the idea as against the feature and short subject program. The coming of sound pictures, however, quickly convinced Katz that the short subject with sound would provide just as good, if not better, entertainment than the presentation offering.

It is estimated that not a few stagehands will be affected by this change in Publix policy, as the presentation route included about 36 theatres which employed many stagehands.

The first theatres outside of the West Coast district to be affected by the change are Southern houses—the Howard in Atlanta and the Alabama in Birmingham. In the Tivoli, Chattanooga, and the Tennessee, Knoxville, the short subject sound reels will supplant regular Keith vaudeville.

SENTRY SAFETY CONTROL



THE NEW YORK TIMES,
NOVEMBER 12, 1928.

MANY CHILDREN DIE IN RUSSIAN MOVIE FIRE

Their Escape Cut Off When Frantic Rush of Grown-Ups Blocks the Exits.

VORONESH, Russia, Nov. 11 (AP).—Many children lost their lives in a fire which destroyed a moving picture theatre at Khodynetz last night, the exact number being unknown pending a check-up by the authorities. Specially organized crews worked all night extricating charred bodes from the débris.

The fire started in the film room during the performance and spread with lightning rapidity, rendering the children's escape exceedingly difficult because of the exits quickly becoming clogged with frenzied grown-ups. Firemen arrived too late to minimize the catastrophe.

The film operator and his assistant escaped by jumping through a window.

Authorities have started an investigation to fix responsibility.

would have prevented this tragedy

SENTRY SAFETY CONTROL CORPORATION

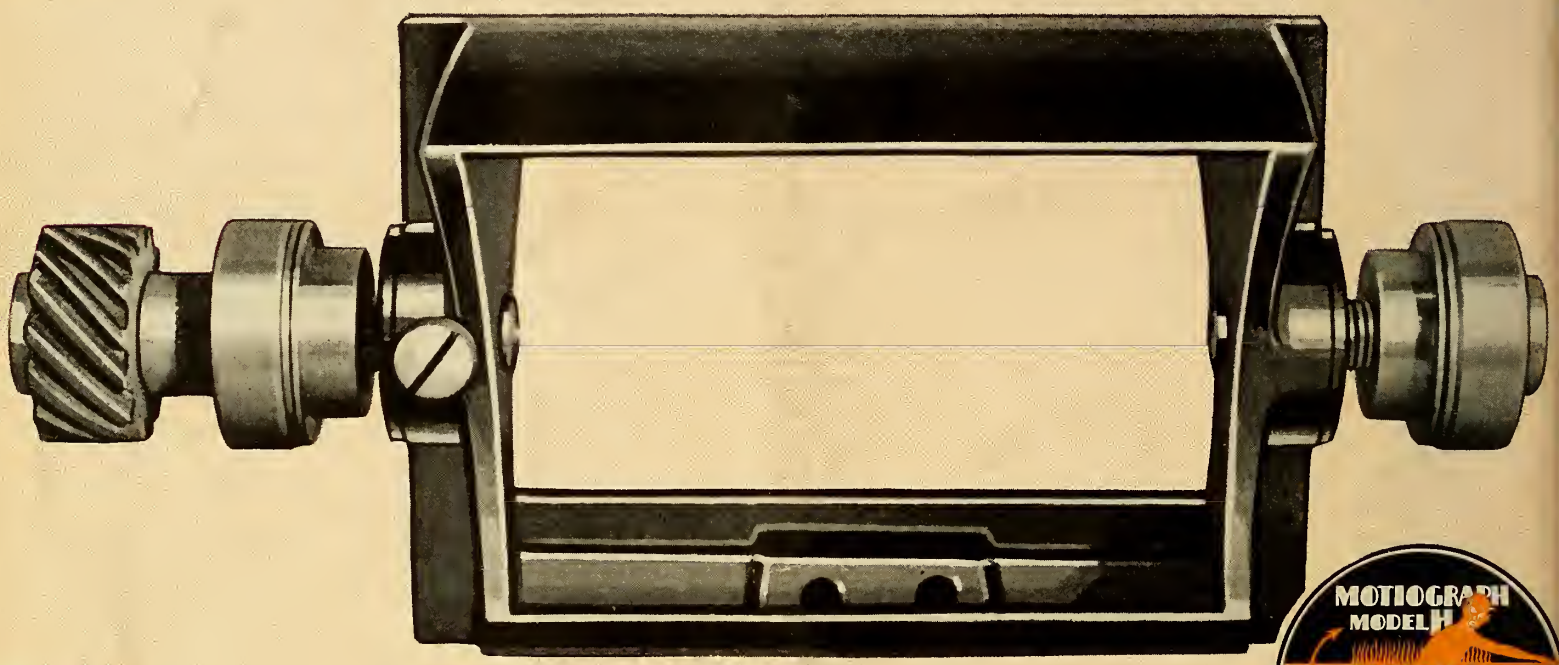
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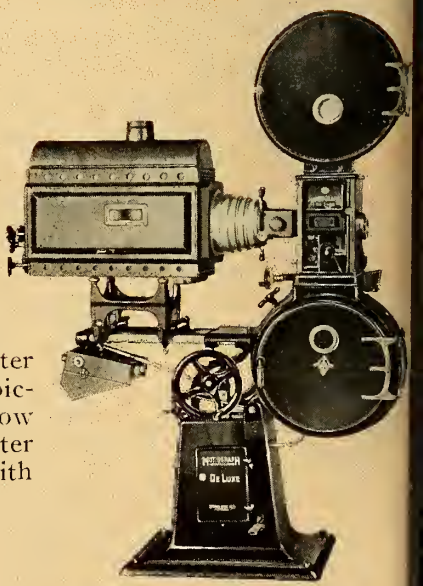
DISC TYPE

The old type front disc shutter cuts off in one direction only, diagonally across the picture. The shutter moving in one direction across the longest dimension of the picture is slow in cut-off and inefficient in illumination.



CYLINDRICAL TYPE

The new Model "H" Cylindrical Shutter cuts off from the top and bottom of the picture simultaneously and across the narrow dimension of the picture, resulting in a faster double cut-off and increased illumination with sharper definition.



AND

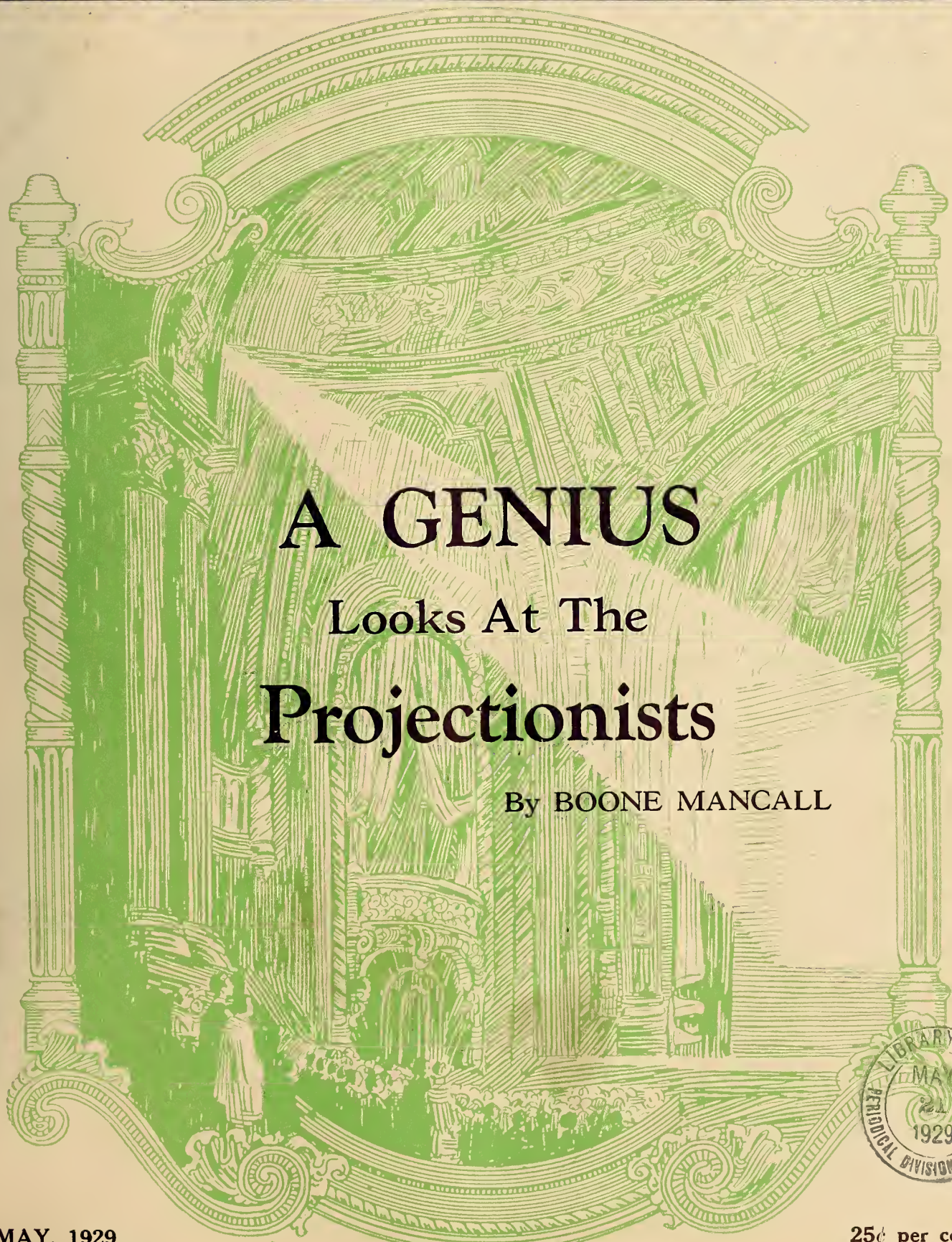
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PROJECTIONIST



A GENIUS
Looks At The
Projectionists

By BOONE MANCALL

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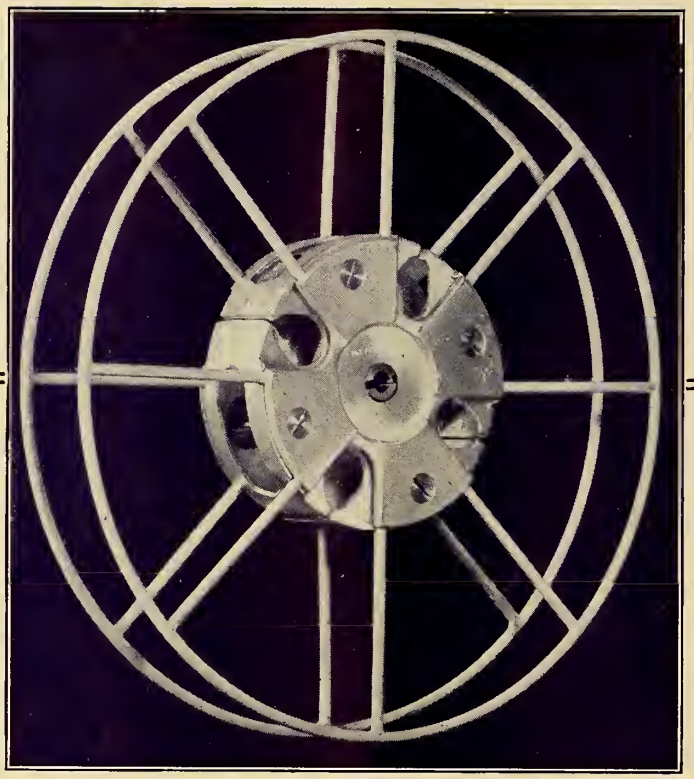
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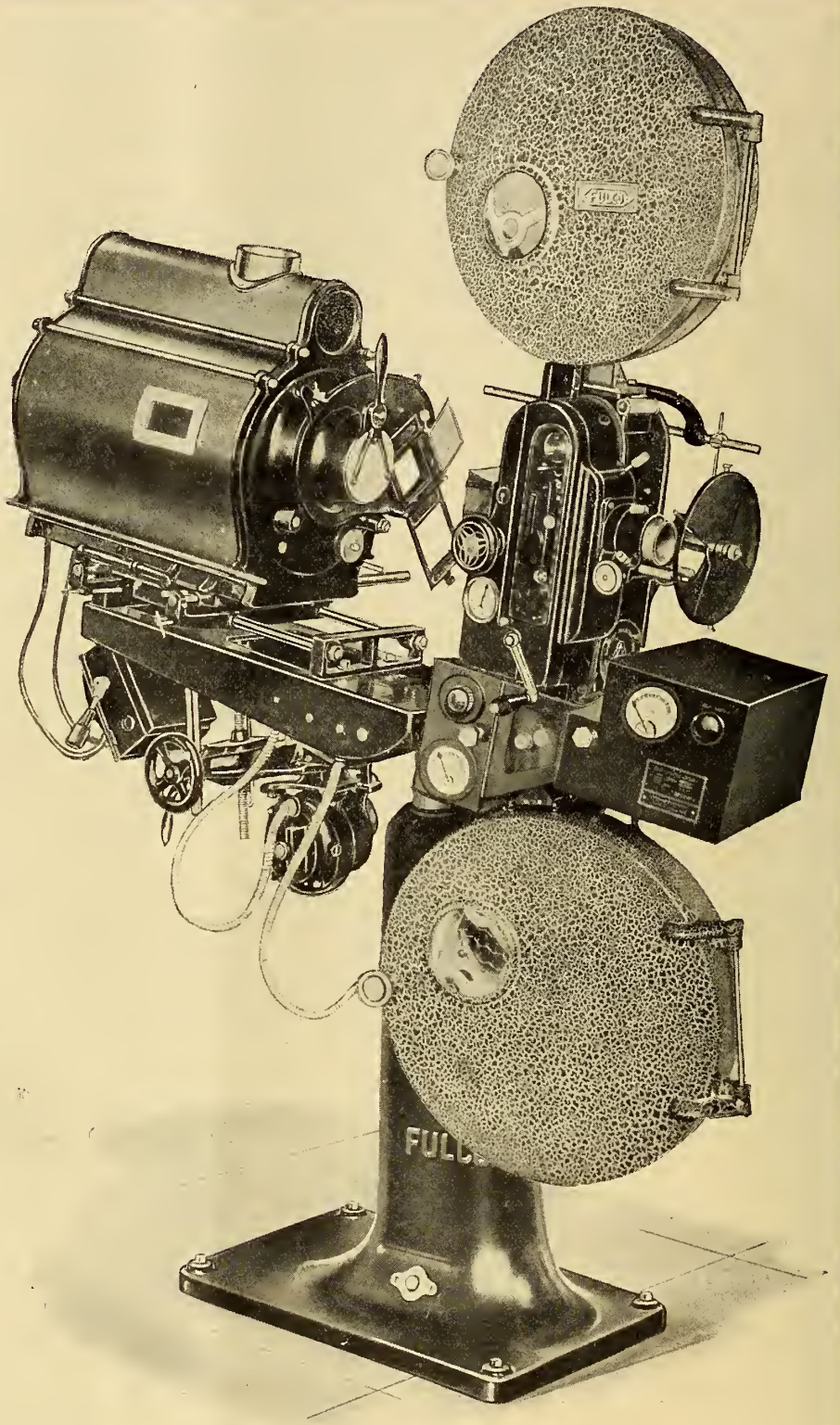
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Errata

IN the statement of ownership, management and circulation of THE MOTION PICTURE PROJECTIONIST which appeared in the April issue, there was omitted statement of the fact that the entire stock of THE MOTION PICTURE PROJECTIONIST is owned and controlled by the Mancall Publishing Corporation. As published, the statement named Boone Mancall as owner; whereas in fact the Mancall Publishing Corporation is the owner, and Boone Mancall is the sole stockholder. This correct information was contained in the original sworn statement, and appeared in the copy submitted to the U. S. Post office.

Postoffice regulations requiring that the printed statement be an exact copy of the statement submitted to them, the entire statement, corrected as stated above, is reprinted herewith:

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, of

THE MOTION PICTURE PROJECTIONIST,

published Monthly at New York, N. Y., for April 1, 1929.

STATE OF NEW YORK } ss.
COUNTY OF NEW YORK }

Before me, a Notary Public in and for the State and county aforesaid, personally appeared James J. Finn, who, having been duly sworn according to law, deposes and says that he is the Editor of THE MOTION PICTURE PROJECTIONIST, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Mancall Publishing Corp., 45 West 45th St., New York City; Editor, James J. Finn, 45 West 45th St., New York City; Managing Editor, none; Business Manager, James J. Finn, 45 West 45th St., New York City.

2. That the owner is: Mancall Publishing Corporation, 45 West 45th St., New York City. Boone Mancall, 45 West 45th St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is . . . (This information is required from daily publications only.)

JAMES J. FINN,
Editor.

Sworn to and subscribed before me this 1st day of April, 1928.

NATHAN REIGROD

[Seal] (My commission expires March 30, 1931.)



Singing scene from "Hearts in Dixie," Fox Movietone film

14% LESS

HERE is a strip of movietone film. Each frame has been reduced 14% to make room for the sound track. You must have more light to project this sound picture on the screen in the same size and intensity as a silent full-sized frame. More light means more juice. National Projector Carbons produce more light on higher intensity . . . the positive carbons form deep, well-rounded craters . . . the National Projector Oro-Tip Negative Carbons do not pencil. When your theater is equipped for sound be sure that you have an ample supply of National Projector Carbons to give you all the light you need.

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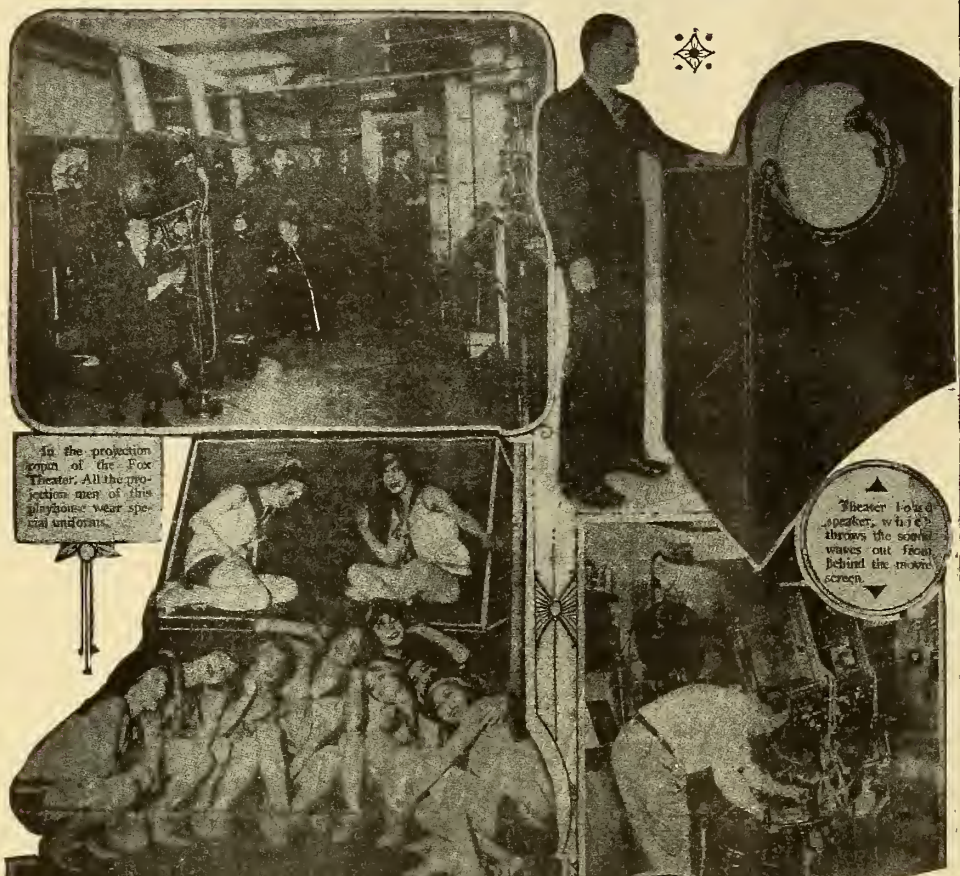
ILLUSTRATED FEATURES

The Sunday Star.

FICTION AND HUMOR

Part 7—8 Pages WASHINGTON, D. C., SUNDAY MORNING, OCTOBER 21, 1928.

Operator Becomes Ruling Figure in Great Screen Revolution



On the stage at the Palace Theater. The two girls above are seated in the loud speaker.



Cutting a "talkie" record

Projectionists No Longer Lightly Held, as Washington Public, Like That of Other Cities, Expresses Great Interest in Mechanical Output of Talking Drama. Upheaval in Profession Observed.

BY DON GLASSMAN.

Gone "talkie"—the whole Capital!

Up and down the Rialto, northeast, southeast, northwest and southwest, all around the town, folks are foaming into a hot lather about the new set of talking glands some doctor of histrionics planted in the movies.

Audiovision grips the masses and is leading thousands to gaudy box offices, where gold piles up as the movie Midases would have it.

A wild Barnum of ballyhoo harangues the passing parade: "Hey, folks! Honest-to-goodness talkies—not just sound—real talkies!" On with the acts. The photographic dumb show wags a whetted tongue!

The restless public is quiescent compared with the pandemonium that rages within the industry. Diamond-studded gentry who sit in Hollywood's mahogany cages and Broadway's star-spangled sanctums are breathing hard these days. Terror-stricken lie the heads of moviedom's czars. Soon news will leak out of a secret pact between members of the Movie Entente, enlarging the scope of present activities and guaranteeing each other to choke competition from any source.

The czars are in cold sweat over the whole business. Last Summer they lost their annual vacations—mostly because new contracts call for expenditures that make the French debt look like a waiter's tip.

Up from the cobblestone of Four-and-a-half street, Washington, Al Jolson "mammied" his way through the turnstiles of melody and all in a quarter of a century, while he was crooning in cabarets and burlesquing on village stages, the calculating mind of man groped and fought for a mouthpiece and loud speaker for the dumb show. When the tongue was finally found the industry was as prepared for the new plaything as it is today prepared for the millennium. It knew all about talkies. Edison had invented the kinetophone years ago and it proved a failure. The public didn't want to hear pictures talk. The movie entente agreed among themselves never to dabble with sound. The members left it to a few experimenters and outcast producers.

Everybody knows the sequel. One producer believed in sound. The first pictures, while not great successes, were received by an apathetic public. Mild interest, that was all. The movie entente chuckled.

Then the sonic upheaval in moviedom rocked the foundations of Hollywood and Broadway. Al Jolson in "The Jazz Singer" was the bombshell. Out of the forty-fifth story window of their office suites the pop-eyed impresarios enthusiastically looked down on the sinuous queues that wound around the city blocks—people waiting for seats. The poor producers! Through their tear-dimmed eyes they saw six-figure contracts grow to seven.

But back home, here on the local movie mart, what have we? Just the bare whispers of what is going on in Hollywood. Here on F street only trumpets blow and the rah-rah spirit is fanned to new intensity. Everybody feels that motion pictures have experienced rejuvenation.

Come inside the theater, go back stage. The stage door's hinges squeak, doormen bands hanging at nothing much to do. Traveling troupes don't arrive so often. Disuse made the door hinges squeak.

Well, you say. It's a funny theater. A stage with a rusty stage door! Where can the actors be? Where are the comedians, the buffoons, the tragedians, the lovers, the dancers and galloping local? Can there be drama without actors?

You will look in vain for any of these stars. They are neither in the wings nor in the dressing room. In our modern theaters the ray of human sunlight is thrown on the theatrical night from the roof—high, high, high up in the projectionist's heaven.

* * * *

THE managers have us fooled. Now they're thinking seriously of nailing up the old door leading to the stage. They say the new stage door must lead to the projection room. Heretofore they had never thought of a projection booth in any terms other than a mere projection booth. They paid a man to adjust carbon arcs and focus spotlights. It was the very last place a manager would care to show a visitor.

Prepare to meet the modern movie theater's most useful fixture, the projection operator. He is impresario of the orchestra, acoustician of the hall, focuser of high lights and breathy trumpets blow and the rah-rah spirit of dramatic atmosphere. A man of respectable talents and great responsibility in these days of upheaval. A man with increased income, too.

"My first 14 nights in a sound-projection room," Mr. Projectionist said, "were some 14 nights. Exciting? Whereas! You don't know the third of it. Think of it. I had voices in the palm of my hand. Just one turn of the knob and they would shriek or whisper. Well, you see, they've taken all the temperament out of the actors. Can't hold out on us any more because of bad colds or headaches. When the curtain rolls up we give 'em the juice and by gum! They sing.

"Everybody, from the manager down to the doorman, knows who I am. Listen, when silent movies were the vogue they'd look at me with a sour-dough face. Now? Well, the pay envelope is raised to the level of a pay roll. And—this is important—when I strolls into my booth, about 11 o'clock in the morning the doorman, the usher and assistant electrician look up and say, 'Good morning.'

"It's a change for the better. And the old way is a good riddance of rubbish. Yeh, we projectionists are men of importance these days.

"Just a couple of months ago the house bought us $30,000 worth of equipment. The manager said: 'Boys, if you want more equipment to help improve your work, please let me know.'"

The projectionist has new tools and toys. In some instances his playroom has been enlarged to permit installation of strange contraptions that take up far more space than the old, simple machinery. To the uninitiated the installations present little more than a tangled jumble of sprockets, shafts, chain drives and cables. These are the machines man has made to talk, sing and weep.

But all this has its human element. A breathing man conceived this machine and breathing men operate it. And still the human factor is the one that man is struggling most to overcome. For it is responsible for the bad cuts, the cacophonous sequences and

(Continued from First Page.)

collapse under the weight of words. The studios were never attuned to sounds or the beauties of language, but now by the strange twist of fate these are their most vital concern. Movie magnificos are becoming as articulate in type as they have been fertile in the production of films. They draw no lines between adjectives or adverbs or between split infinitives and prepositional phrases. They're simply talking, and with such volubility that it seems they will soon outdistance Congressment. Such exhortations, warnings and bulls never issued from a public parliament, and the end is nowhere in sight.

* * * *

"THE other day," said a projectionist, "the father of twins was talking with me about the talkies. He showed great interest in the technical end of the projection. I couldn't understand what it was all about.

"Why do you want to know all this,' I asked him.

"'Oh,' he said, 'I'm going to invent some way of synchronizing the yells of my babies.'"

While the projectionist feels honest pride in his new responsibilities, he is at the same time restricted should his hankering for invention overcome him. He is told that no experiment with his new apparatus is strictly taboo, inasmuch as it can suffer no improvement at his hands. Already leading engineers have lent the weight of their intelligence to a solution of "talkie" problems. The operator is told that "lighting may strike a tree, but for your one struck millions remain. The chance of an experiment by you working improvement in your apparatus are about in the same proportion."

But the projectionist, who for a time "was scared stiff at the wires, gadgets and imposing looking panel board," will undoubtedly bring to light a good many improvements that will be adopted generally.

A new billion-dollar industry shows itself on the American scene. Almost with Aladdin-like magic tremendous buildings are springing up in all parts of the land. A $10,000,000 studio is contemplated. All the energy, enterprise and intrepidity that characterize the Nation are being thrown pell-mell into the production and perfection of audiovision.

The man on the streets knows little of the magnitude of this development. Even some within the industry are at sea. For when the movie artists adopts a course of action it never acquaints the people or exhibitors with reasons. There are privy councils and secret debates. No member ever commits himself on an issue. But some day the industry rubs its eyes to see a gushing torrent of gold pour out of the exhaustless treasuries, and, lo! there stands a new set of buildings.

Just a little more than two short years ago the first Vitaphone production was shown in New York at the Warner Theater. There was little enthusiasm in the first audience. The first audiovision speaker to appear was Will Hays, generalissimo of celluloid. He talked his lips brushed words and the novelty of this phenomenon aurally awakened some dormant reaction. As leader of the industry, Will said, it was his signal honor to indorse audiovision and appear before the first audience. A spontaneous burst of applause greeted him.

From then till now is a short time. All over the land agents and salesmen of respectable talents and great responsibility in these days of upheaval. A man with increased income, too.

"My first 14 nights in a sound-projection room," Mr. Projectionist said, "were some 14 nights. Exciting? Whereas! You don't know the third of it. Think of it. I had voices in the palm of my hand. Just one turn of the knob and they would shriek or whisper. Well, you see, they've taken all the temperament out of the actors. Can't hold out on us any more because of bad colds or headaches. When the curtain rolls up we give 'em the juice and by gum! They sing.

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But all this has its human element. A breathing man conceived this machine and breathing men operate it. And still the human factor is the one that man is struggling most to overcome. For it is responsible for the bad cuts, the cacophonous sequences and allowed the opportunity to skip by. And now they pay.

* * * *

UNFORTUNATELY, the entire industry is paying for the big mistake. As yet no noticeable price advance has been saddled on the public. Some students believe it is nonsense to talk about the great possibilities of audiovision. The fact that a few pictures have drawn record-breaking crowds means little. With the adoption of talking projectors by neighborhood theaters will these jams continue? The supply they argue, has close relation to the demand. When talkies become more plentiful they will not be nearly so popular. The novelty will have worn off, and what will happen after that most exhibitors are afraid to predict.

One authority reports:

"At the studios everybody is running around in circles. Producers want equipment, but can't have it. Without soundproof studios the present machinery is useless for high-class work. It is said that soundproof material cannot be supplied during the present selling season. The result is that the producers, pressed by necessity, will adopt makeshift methods, and their product will be likewise.

"Even with soundproof studios, recording requires that they be located on big ranches, far from the noises of city streets. And few studios are thus situated.

"And the technical problems of production are massing themselves solidly. They demand sound experts especially. Heretofore there never was a demand for acoustic ians, and now their salaries are mountainous.

"Scenes must be made longer in order to permit liberal cutting. Reels, too, must be made longer. The 3,000-foot reel is the vogue, the object being to have as few joints as possible. All this adds to production costs.

"Producers having studios near streets are often compelled to do their work during the dull hours of night, even though they may have soundproof rooms. This keeps the company idle during the day and often necessitates additional helpers.

"While a scene is being shot the carbon arcs may start hissing and singing. This plays havoc with the record. The scenes must be retaken. Within the past few months producers have been convinced of the wisdom of incandescent lighting systems. These, too, cost money.

"The problems of acting are multiplying. A picture is cast, but after the shooting is begun the director finds that the voice of one star does not register well. Recording must cease and time be taken to recast the whole production."

What faces the industry, then, is a mass of technicalities that rarely concern the public, although they show themselves in the finished product. A new call has gone out for technicians, vast armies of men trained and schooled in science. Yet even after they are developed they must become privy to some mysteries of psychology. The producer is playing a game of hearts and minds, not lons and electrons. An acoustician must not only understand technical problems. He must know what voices have human appeal, what pitches excite pathos and remembrance and what tickle the sense of humor.

The movie laboratories are wound up in a labyrinth of film. Printing of talking pictures is an amazingly difficult operation. Film must be free from scratch or spots. The tiniest defect will show up in the theaters loud [illegible] almost to the point of [illegible] strain fastened by the movie industry is [illegible] west to the [illegible] develop- [illegible] of those [illegible] musi- [illegible] pro- [illegible]

[illegible] speakers. Sound film is printed for about 2½ cents per foot, but the cost of printing talkies is double.

New troubles come with distribution. There prints are made—one with the sound track, the second synchronized with disc records, and the third for silent reproduction. This increases the possibilities of mistakes in shipping. If the wrong records are sent with the wrong film, somebody loses money and suffers.

* * * *

THE scenario writers have their [illegible] rugated brows, too. They are confronted with the writing and shaping of a new type of story—a literary work that will bridge the yawning gap between action and talk. This requires minds of the most fertile imagination. The whole picture must be written in the writer's mind's eye before he sets down the opening dialogue. And a movie dialogue is not any old speech. Actors must be made to talk naturally, attiled languages, obscure words and subtle expressions being barred.

Deep in their hearts and privily, producers know that most of the present sound pictures are "flops." Without the noisy accompaniment they would be hissed off any village screen. But the public takes to them, nevertheless.

Actors who can make the President's American language behave are in demand. The frigid zero hour is nigh for Hollywood's B. B. D. (beautiful but dumb). The movie mart is freighted with young men and women who have learned to do exactly what the director tells them and at the right time. Only a few ever discovered what in the name of horse sense it's all about.

What the hasty voices of directors bawl for is a voice, articulate, musical, refined and well modulated. At the same time the speaker must be an actor and not unpleasant to the eye. Candidates for this position are rare enough. Consider that in the several years in which the public has cast its critical spectacles on the audiovision scene, only one—Al Jolson—has been admitted to the ranks of high-powered stardom. It's whispered about that the crooner who used to sing on the streets of Washington's Southwest is drawing a pay roll in the seventh place of bank digits.

How much midnight oil and kilowatt juice has been expended in a profound study of how the blackface comedian and his backers did the trick. The value of "The Jazz Singer" without sound is assumed to be only 20 per cent. The public had already seen and heard a talking sequence in "The Better Ole," but the human appeal was not emphatic.

After a lot of banter the diagnostic minds pronounced judgment. "What made 'The Jazz Singer' a great picture," they said, "was the novel sound of an emotional heart talking and singing to a mother, the soul-stirring chords of 'Mammy,' bellowing out from what seemed to be a real human mouth, tearing the strings that bind every mother to her son and bringing a tear-storm into the eye."

Even though audiovision should increase theater attendance a great readjustment is bound to come in the sphere of celluloid. Unless it comes very soon, few producers will be able to show profits this fiscal year. It is generally admitted that losses will be great.

And it is extremely doubtful whether exhibitors can absorb the plethora of talking features that have been mapped out by producers. It is believed by various doctors of filmology that after the first thirst of the public has been satisfied the vacillating taster of patrons may trend toward short subjects, comparing [illegible] it was merely novel. And when the public tired of novelty the talkies would be thrown out of theaters indefinitely. Years ago the idea was attempted and met with miserable failure. [illegible] Hobbs and [illegible] pocket, and, lo! pulled out the hunted needle.

* * * *

STORY is told of the projectionist whose ears were so well attuned [illegible] and undesirable noises that he [illegible] victim of his own adaptability. [illegible] vacillating notes floated through [illegible] one performance and he [illegible] examination of everything that might have [illegible] last frantic test the manager should grumble. He going over his equipment's assistant into the [illegible] clues, and the shortly, saying: the audience eat-

[illegible] theater manager sympathy projectionists of their films [illegible] to a great production, [illegible] arding the [illegible] ented [illegible] ents are [illegible] matter

[illegible] cell in [illegible] er in a [illegible] or, now [illegible] han the [illegible] broken [illegible] ne and [illegible] um for [illegible] bosom. [illegible] boy.

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[illegible] ing picture [illegible] sixth scene [illegible] contented as [illegible] a savvy inside [illegible] it is going per- [illegible] a flash if anyone [illegible] You mechanical part [illegible] with the spirit. [illegible] are running through sound waves. you [illegible] of the audience—in [illegible] e picture and you are [illegible] sent. You know what [illegible] on [illegible] t is as well as if [illegible] g out front. [illegible] consciousness is a hunch, [illegible] primarily pure one. It comes [illegible] cault of mechanical knowledge. [illegible] observance of details, keeping [illegible] and feeling responsibility.

"For as sure as there's a light on Broadway the results depend upon the boys in the booth."

Between warnings, rules and suggestions, the teacher delivers a few wheezes in order to keep his students in good humor. He writes, for instance:

The other week somebody reported that an enthusiastic projectionist was cleaning the sound gate with his handkerchief. That's all right, unless he had a bad cold."

The great industry has roused itself from a quarter century of silence and now spouts euphemisms and synonyms that will shortly make lexicographers

(Continued on Seventh Page.)

BETTER PROJECTION PAYS

Simplex PROJECTORS

ADOPTED BY ALL SOUND SYSTEMS

ADVANCING WITH EVERY PROGRESSIVE MOVEMENT IN THE MOTION PICTURE FIELD

International Projector Corporation

NEW YORK

Recent Advances in Wax Recording

By HALSEY A. FREDERICK
Research Dept., Bell Telephone Laboratories

SUCCESS of recording and reproduction of sound by the so-called "electric" method with a disc record may be considered as depending on several factors. In order, these are: the studio, with its acoustic conditions; the microphone; the amplifier; the electro-mechanical recorder; the "wax" record; the copying apparatus and procedure; the hard record, or "pressing"; the electric pick-up; the amplifier; the loudspeaker; the auditorium. The chief problem is that of making the speech or music reproduced in the auditorium a faithful duplicate of the original sounds, using this chain of apparatus. Cost, reliability, and the time required for the process of recording are among a number of other considerations, but these are all subordinate to the problem of fidelity. While it may be convenient, or even necessary, to introduce distortion into certain of the steps to compensate for such distortion as may be unavoidable in others, experience shows that it is desirable for the sake of simplicity, reliability and flexibility to reduce such corrective warping to a minimum, and to make each step in the process as nearly perfect as possible.

Perfection of a complete recording and reproducing system may be judged by the practical method of listening to the overall result. Each element of the system must be analyzed thoroughly, however, if outstanding excellence is to be obtained. One of the most useful of the means of analysis is study of the response—frequency curve. In order that all frequencies be reproduced equally and that the ordinary faults of resonance be avoided, this curve must be flat and particularly free of sharp curves.

Good reproduction requires that frequencies from 50 to 5,000 cycles be included without discrimination. If, however, frequencies down to 25 or 30 cycles be included, a noticeable improvement will be obtained with some classes of music, while if the upper limit be increased to 8,000 or even 10,000, the naturalness and smoothness of practically all classes of reproduction will be noticeably improved.

A second important criterion of any system is that the ratio of output to input shall not vary over the range of currents or loudness from the minimum up to the maximum used. If this requirement be not met, sounds and frequencies not present in the original will appear in the reproduction. This is the type of distortion commonly produced by an overloaded vacuum-tube amplifier; it is often called *non-linear distortion.*

A third requirement not entirely dissociated from the first two is that any shifts in the phase relations shall be proportional to frequency.

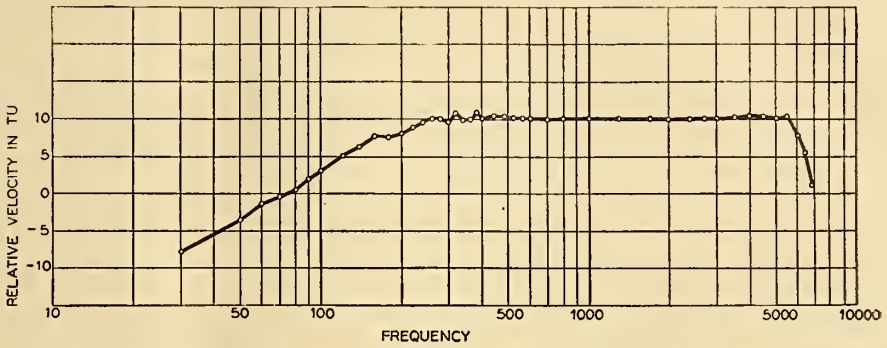


Fig. 2—Typical frequency characteristic of a commercial recorder

Improved Standards

Since our standard of perfection in sound-reproducing systems are growing constantly more exacting, over-all results that seemed excellent a short time ago are only fair today, and before long may seem intolerable. It has, therefore, been necessary for the analysis of each step of the system to be constantly more searching and fundamental.

Of the eleven links in the chain of apparatus for electrical recording and reproduction, only five are peculiar to the wax method. These are, the electro-mechanical recorder, the wax record, the copying apparatus, the "pressing," and the pick-up or reproducer. The extent to which the wax method is capable of the highest quality of reproduction will be disclosed by an examination of these five links. Any consideration of the practical advantages or disadvantages of the method can logically follow this examination into the quality possibilities. The considerations which follow refer to the so-called *lateral-cut records,* in which the grooves are of constant depth and oscillate or undulate in each case about a smooth spiral. This type of record is used in the Western Electric Company method, of synchronized motion pictures which uses the disc records. Some but not all of the considerations might apply to the "hill and dale" records, but the characteristics of these records will not be discussed.

The Electro-Mechanical Recorder

The first piece of apparatus in the chain unique to the wax process is the electro-mechanical recorder, whose function is to receive power from the amplifier, and with it drive a mechanical recording stylus. The present-day recorder is a highly developed apparatus based upon extensive experimental as well as theoretical studies. Recorders which have been supplied by the Western Electric Company have been designed to operate over a range of frequencies from 30 to 5,500 cycles.

The device operates in a linear fashion over the range of amplitudes involved in speech and music. As is seen in figure 2, the response falls off below about 250 cycles. This falling characteristic is necessary in order that the maximum loudness be obtained from a record for a given spacing between the grooves without cutting over from groove to groove. A characteristic of the pick-up is that the voltage induced in its windings is proportional to the velocity with which the armature moves. In order therefore that a lateral oscillation of the needle point may furnish constant output voltage, it is necessary that the lateral velocity of the needle point be constant. For a sine wave, velocity is proportional to the product of amplitude and frequency, so that as frequency increases, amplitude must decrease proportionately.

With the characteristic shown with these recorders, constant velocity is obtained

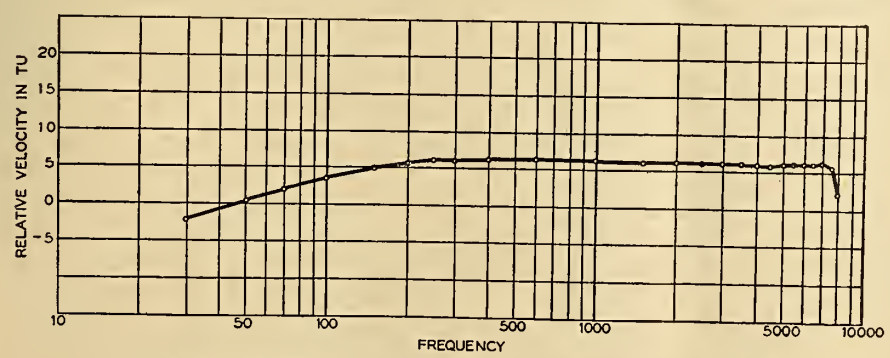


Fig. 3.—Frequency characteristic of a recent laboratory recorder

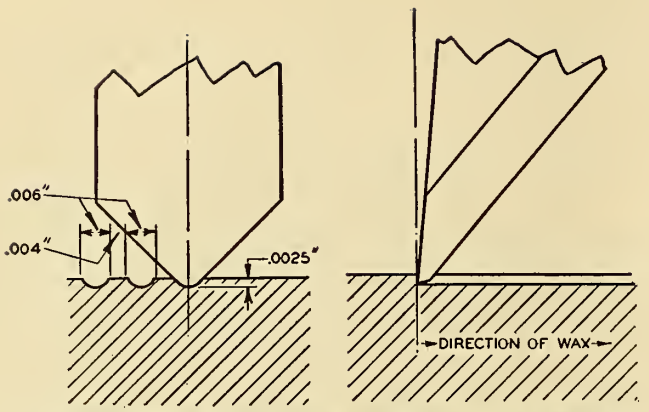


Fig. 5—Details of Stylus point of recorder. Left, a radial section through wax; right, section looking from stylus to center of the disc

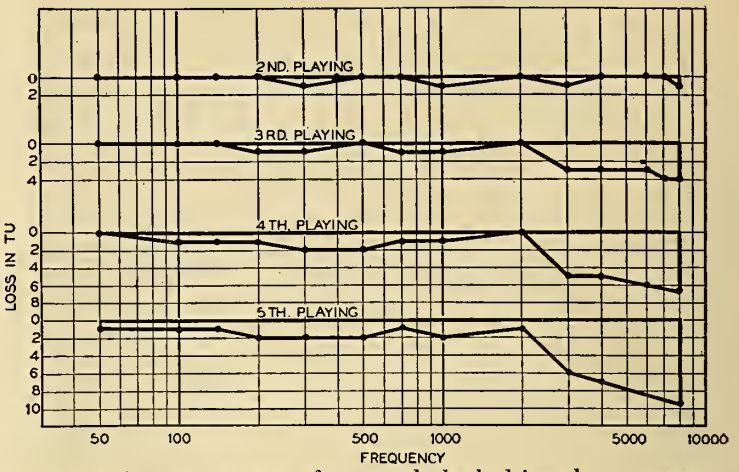


Fig. 8—Loss in response of a wax playback driven by a constant-velocity wax record, on successive playings

from about 250 cycles to 5,500 cycles. Below 250 cycles an approximately constant amplitude is obtained. If, therefore, sounds of constant absolute intensity are to be recorded over this range of 30 to 250 cycles, there is equal tendency for sounds of the different frequencies in this range to over-cut the record groove. Attenuation of the lower frequencies by the recording apparatus may be corrected in production by a suitable electric network. Such a network will increase the subsequent amplification required but, as this additional amplification occurs in the first stage, it is not expensive. Practically, it has not been found necessary or desirable to introduce such a corrective network since the correction has been largely cared for by the characteristics of the pick-ups which are used.

Recording Procedure

In recording, the usual procedure is to use a disc from one to two inches thick and from thirteen to seventeen inches in diameter, composed of a metallic soap to which small amounts of various substances have been added to improve the texture. This disc, commonly called a "wax," is shaved to a highly polished surface on a lathe, and then is placed in a recording machine, essentially a high-grade lathe, by which the wax is rotated at a very uniform rate and in definite relation to the film with which it is being synchronized.

The recorder with its cutting tool is moved radially across the surface of the disc (common phonograph procedure being to record from the outer edge of the disc to the center), whereas with records for Western Electric sound pictures the direction is reversed. After a record has been cut the wax may be handled and with proper precautions may be shipped from place to place.

The shape of the groove varies somewhat in commercial practice. That used in records for Western Electric apparatus is approximately 0.006 inch wide and 0.0025 inch deep, and the pitch of the spiral is between 0.010 and 0.011 inch, so that the space between the edge of the grooves is about 0.004 inch. Thus the maximum safe amplitude is about 0.002 inch. If this is reached at 250 cycles the corresponding amplitude at 5,000 cycles, assuming that the sound is constant in absolute intensity over the intervening range, will be only 0.0001 inch.

Recording Speed

In the records used with Western Electric apparatus the liner speed of the groove past the reproducer point ranges from 140 feet per minute, at the outside of the spiral, to 70 feet per minute at the inside. The rate of rotation is dependent upon the outer diameter of the grooves which is determined primarily by the length of time to be covered by a single disc. When the minimum linear speed and the groove spacing are decided upon, there is an optimum relation between the size of the record, the rate of rotation and the playing time.

Since any roughness in the walls of the groove introduces extraneous noise in the reproduced sound, it is important that the groove be kept truly smooth. Before starting, the surface of the disc must be shaved to a high polish, and the texture must be fine and homogeneous. Not only must the composition be correct but the proper temperature must be retained during recording. Waxes may be obtained commercially whose texture is satisfactory over the ordinary range of room temperatures. The disc must be leveled in the recording machine with reasonable care, and the stylus must be sharp and of a shape to insure a clean cut. The wax shaving is removed as cut by air suction. To aid in maintaining the cut at the correct depth there is a so-called advance ball which rides lightly on the surface, supporting the stylus at the proper height in spite of small inaccuracies in leveling the disc or deviations from planeness. For adjusting the advance ball with respect to the stylus, the groove is observed with a calibrated microscope. Maintenance of the necessary adjustment and satisfactory operation of the recording machine requires an ordinarily skilled mechanic with reasonable experience.

AFTER a record has been cut the sound may be reproduced directly from the wax by means of a suitable pick-up or reproducer. Ordinarily reproducers rest much too heavily on the records to be used on wax; the vertical pressure between needle point and record in an ordinary phonograph is of the order of 50,000 pounds per square inch. Obviously any such pressure would destroy a groove in the wax.

These high pressures have been necessary in order that the groove might drive the needle point of the reproducer properly; their reduction requires the reduction of the impedance offered by the needle point by transverse vibration. Such reduction of the impedance of a "play-back" mechanism requires that both its mass and its stiffness be cut down to a minimum. That now available has been designed with those requirements in view, and represents a large advance toward ideal reproduction. Whereas play-backs formerly in use failed to reproduce the higher and lower frequencies with much satisfaction, response of the new piece of apparatus is not widely different from that obtained from finished

(*Continued on page* 36)

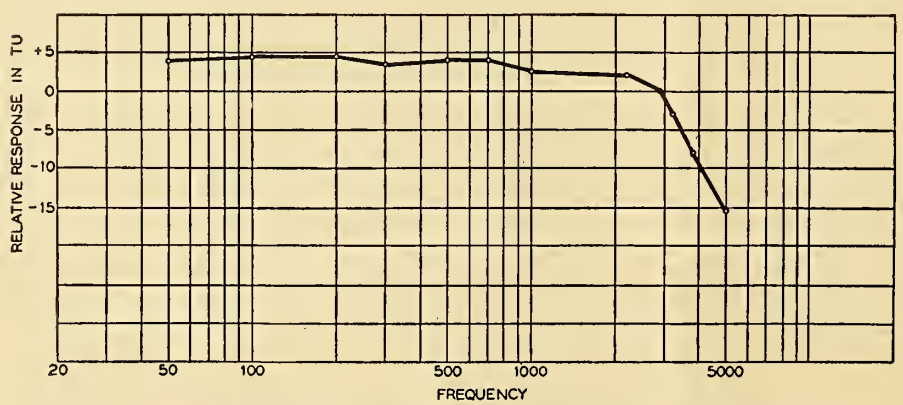


Fig. 7—Response of wax playback driven by a constant-velocity wax record

Why exhibitors install the Western Electric Sound System

IT *is designed* by the Bell Telephone Laboratories, the largest research organization in the world devoted to the problems of acoustic engineering.

It is manufactured by the Western Electric Company in the same factories and to the same standards of quality as is the telephone apparatus of the Bell System.

It is the system by which the following producers are recording all of their productions:

Warner Bros. Pictures, Inc.
Fox Film Corporation
Paramount Famous Lasky Corporation
Metro-Goldwyn-Mayer Pictures Corporation
United Artists Corporation
First National Pictures, Inc.
Universal Pictures Corporation
Hal Roach Studios, Inc.
Columbia Pictures Corporation
Harold Lloyd Corporation
Metropolitan Sound Studios, Inc.

It insures the same quality of sound reproduction in the theatre that goes into the recording of all these productions in the studio.

It has been in successful commercial operation in theatres for two years and nine months and is the system that has brought about the adoption of talking pictures by the motion picture industry.

It is installed and successfully operating in 2000 theatres throughout the world.

It will give the same year in and year out service as does your telephone.

It is installed under the supervision of experts selected from among the staff of telephone installers of the Bell System.

It is maintained and serviced by a national organization of experts skilled in the maintenance of telephone service.

It offers the greatest freedom from breakdown and program interruption.

It is adequately protected by a large group of fundamental patents which insure the exhibitor against damages arising from patent infringement.

It is leased upon a reasonable profit basis which this Company is under contract not to exceed, thus protecting the exhibitor against excessive charges.

It is leased upon a time payment plan that eases the exhibitors' financial problem.

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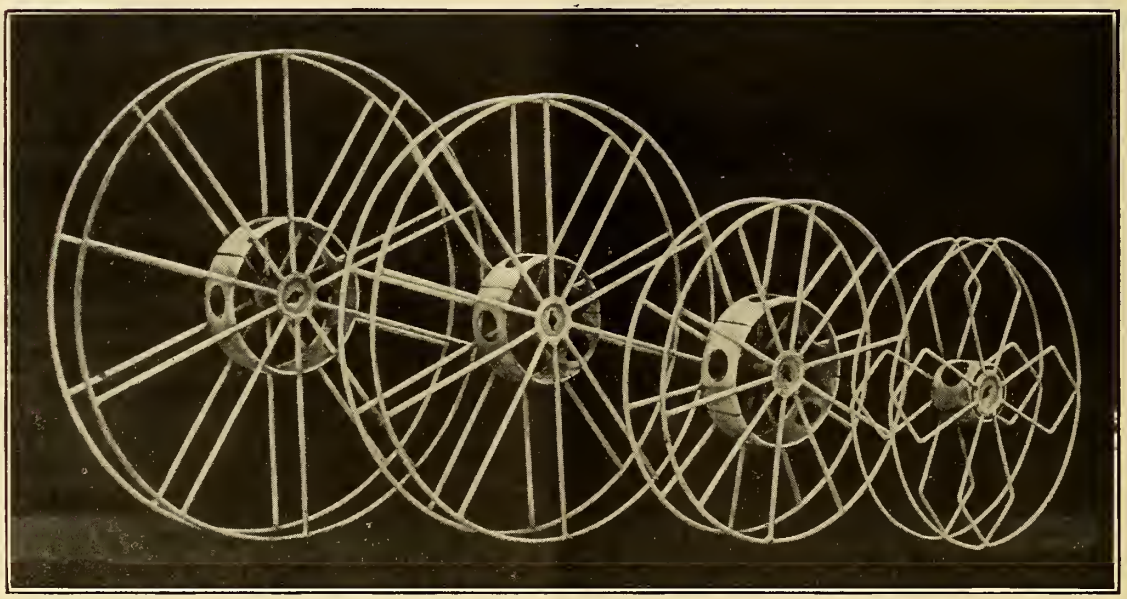
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Projection a Specialized Art

By LESTER B. ISAAC

President, Projection Advisory Council

This article is to be issued as a report of the Projection Advisory Council and has been prepared with the cooperation of members of the Council. We have endeavored to show how this organization can render a highly important service to all projectionists. The time has come for us to learn the value of good-will secured through systematized publicity. The Projection Advisory Council intends to use all the power of unified effort to educate the industry and the public regarding the importance of good projection.

LESTER B. ISAAC

President, Projection Advisory Council

THE formation of the Projection Advisory Council represents a new step in the advancement of the projectionist and a further recognition of the value of good projection. The organization has a number of important activities, all of which will in time be given due attention, but one of the most important of these will be to develop organized, systematized publicity for projection and projectionists. The Motion Picture Producers and Distributors of America, under the leadership of Will C. Hays, has done a tremendous amount of good for the industry, and vast sums have been expended to create understanding and good-will for motion pictures. Undoubtedly this money has been well expended and the work highly successful.

If the leaders of the industry can see the value of good-will and are willing to pay for it, does it not seem reasonable that something of a similar nature would be good for projectionists? Council will have a limited amount of money to spend for all its activities and therefore cannot pay much for publicity, but something definite can be accomplished along these lines with the active assistance of the projectionist, supply dealer and equipment manufacturers of this country.

Steady Progress Essential

Real publicity should not be confused with mere exploitation; and what the Council proposes to do is to educate the industry and the public regarding the fine points of good projection and their importance. We believe that through the efforts of the Council the projection standards can be raised with resultant benefit to projectionists through increased understanding for his responsibilities.

The standing of the projectionist has been greatly improved and this is of course largely due to the tremendous growth of the motion picture industry. Only by keeping thoroughly posted regarding present conditions can any individual or organization be properly prepared to meet the changes that are constantly taking place. Vast changes have been made in the technical departments of the industry, and other, and perhaps greater, improvements will be made at no very distant time.

The Advisory Council

With the organization of the Projection Advisory Council complete, projectionists now have what may be termed a court of appeal to which they may turn for advice on problems which heretofore have taxed the ingenuity and resources of the craft. The Council is fortunate in its choice of leadership no less than in its good fortune to have the benefits of the knowledge and experience of a group of leading projectionists throughout the country through the medium of its organization structure which divides the work up among committees each of which is headed by one of the leading specialists in that particular branch of work.

With such men as Lester Isaac, Rudolph Miehling, W. D. O'Brien, Harry Rubin, Thad Barrows, P. A. McGuire and a score or more of equally prominent projection authorities to guide its destinies, the Council is assured of a long and valued life, if a busy one.

Projectionists everywhere may help the Council to help them by cooperating fully with the organization in the exchange of views and pertinent information on projection problems. Contact with the Council may be established through the THE MOTION PICTURE PROJECTIONIST, which will be glad to forward all communications to the Council to the proper authorities. The work of the Council is for your benefit, and its value shall be measured by the extent of your cooperation.—THE EDITOR.

In this country the cost of change means little and great manufacturers think nothing of scrapping machinery that has cost millions of dollars if better results can be secured with newer equipment. The company that does not make these changes will soon be outdistanced by progressive competitors. The individual who does not keep up with the times will have the same thing happen to him. The projectionist who expects to stay in this work cannot afford to go to sleep on the job. He must understand his present work and be ready for any changes that may be made.

Until quite recently the importance of projection failed to receive adequate attention. It must be conceded that with the introduction of sound the technical departments of this field attracted more attention, and projectionists are undoubtedly benefiting thereby. The leaders of the industry are spending great sums for sound equipment and are outgrowing what was once a fixed habit of economizing on projection equipment. The following quotation from the bulletin of the S. M. P. E. is interesting and tends to confirm the statement made in the preceding sentence:

Improved Technical Standards

"The men who built up the motion picture industry possessed a very practical knowledge of Showmanship and great business ability, but little or no technical knowledge. As a rule, they left technical details almost entirely to subordinates. In time the subordinates developed real executive ability and became highly specialized experts in their own departments; but they have often been handicapped by the indifference to the importance of their work. This indifference has been costly, and the industry has been paying and will continue to pay for many years for errors which might have been avoided."

In the past a few voices were raised in the effort to induce the industry to take projection much more seriously. Prominent among these were F. H. Richardson and P. A. McGuire. The latter, through his advertising for the International Projector Corp., has done much to better projection conditions and projectionists owe him much. McGuire coined and stressed the slogan "Better Projection Pays" until it became a slogan of the industry. The following statement from the same source also attracted widespread attention:

"The motion picture projector is no longer a mere mechanical contrivance, cranked by hand, or made to operate by the simple closing of a switch. The projectionist of today must have an excellent knowledge of mechanics, electricity and optics and is in charge of a delicate and complicated mechanism made with scientific accuracy to handle a fragile and inflammable material."

And another: "The projectionist has a great responsibility—for a failure to measure up to the right standards means that all the producer, director, actor and cinematographer have striven for loses much of its artistic and commercial value—the pleasure of the audience is lessened—the exhibitor is subject to constant and unnecessary expense—and lives and property are endangered."

Tribute by Barthelmess

Richard Barthelmess recognized the importance of the projectionist in what is probably the finest single expression regarding the latter's work: "The projectionist with his projection equipment is largely

(*Continued on page* 25)

A Genius Looks At the Projectionists

By BOONE MANCALL

¶*Dr. De Forest Speaks His Mind*

IT is only fair that such criticism as is at times leveled at the craft be placed squarely before it. In these columns we have often published the words of praise for the craft that have been said by prominent people. When a man of Dr. Lee De Forest's standing in the scientific world speaks, his words are worth reprinting. Dr. De Forest was the guest of honor at one of the sessions of the Society of Motion Picture Engineers' Convention held in New York last week. He is admittedly a genius. Therefore he spoke with authority. In effect, this is what he said:

Sound pictures are still in an imperfect state. Most of the faults which have revealed themselves are the laboratory's: that is, the engineers still have a great deal to accomplish to make sound apparatus better and more pleasing to the public. They could have accomplished more if they had not gone on so rapidly—but the engineers were forced to work rapidly and make hasty conclusions because the business people back of them wanted to get their devices out in a hurry in order to cash in on a public still eager to hear this newest novelty. Part of the fault is the studios: inexperienced men at the cameras and inexperienced directors. For instance, Dr. De Forest said that he had seen long-distance shots with sound as loud as thunder and he had seen close-ups with sound as faint as a whisper. The trouble in these cases, he could plainly see, was not the projectionist's but the studios'. He also blamed the laboratories for imperfect work in printing.

Dr. De Forest said that most theatres were improperly built, acoustically, for sound. This cannot be remedied unless the theatres are wrecked and new ones, acoustically perfect, put up in their place. This is, of course, almost an impossible optimism—so most of the theatres in the country will have imperfect sound reproduction for a very long time. In time, said this famous scientist, a new school of engineers will arise, acoustic engineers, who will play a great part in the industry.

¶*As for the Projectionist——*

THEN—and he laid a great deal of stress on this phase of his speech—the projectionist is to blame because he does not learn fast enough. Dr. De Forest explained that he had found varying degrees of inexpertness among projectionists: some did not want to learn; others wanted to learn but didn't know how to go about it; still others would learn very quickly but were denied the education from those who might supply it. He urged those present who were in a position to bring about a great knowledge of sound apparatus, to spread it as quickly and as efficiently as possible.

What chiefly interested those present who knew something about the difficulties of getting educational information from the various sound companies was Dr. De Forest's observation that the projectionists were denied sources of information—that these sources were bunged up and guarded so zealously against the most legitimate people seeking it.

In this connection we are reminded of the fact that this publication has tried and is always trying to get this information; but even we, with our many connections, are unable to pierce the thick veil of secrecy which many companies (almost all of them of the smaller and less important variety), have wrapped around themselves. For what reason they are doing so we cannot imagine, yet these same companies are advertising heavily in the trade papers, trying to unload their devices upon the exhibitors.

¶*Production vs. Projection*

WE will not presume to fathom the inner workings of these gentlemen's minds, but we print the foregoing in order to impress upon those present and the hundreds who were not present that this situation is more serious than even Dr. De Forest suspects. De Forest in just so many words said that the work of the entire production staff would go far naught if the projectionist were unable to become fully acquainted with the *details* of operation of all sound picture devices.

Starting from this point, De Forest went on to say that he had heard much talk about this power of the projectionist to render null and void the best efforts of a vast producing organization, but he had yet to hear of any group going out of their way to make things easier for this overlord of their destinies by so much as an extra effort to supply all necessary information for the efficient operation of the various sound systems. In short, De Forest implied that since it was generally acknowledged that the projectionist was depended upon to put across the show, he saw no reason why there should not be less talk and more action with regard to the problem of educating the craft.

¶*With a Bow to Dr. De Forest*

THIS argument of Dr. De Forest's has been the theme of many, many expositions on the same subject within these columns, but it undoubtedly took a man of his ability, experience and repute, in addition to the place he chose to utter his thoughts, to drive home to the industry the urgent necessity for such action. What has been said in these pages time and again was simply given a new and greater impetus when voiced by Dr. De Forest.

"Cooperation" has been the keynote of many manufacturers in their sales campaigns for sound devices, no less than it has been the slogan of their engineering staffs who protested their willingness to do anything and everything to help the projectionist become proficient in the operation of their devices. But "cooperation" merely as a word failed to have any particular significance when it came to loosening the tongues of those to whom appeals were made for information on this, that or the other phase of their apparatus.

One meets projectionists who take great pride in the fact that unaided they applied themselves and gained a good knowledge of sound "all by myself," as they say. Such men are to be commended for their enterprise, but it should be remembered that very few men, certainly all those who do not live in big cities, have this chance to educate themselves. And it is to this large majority that the sound equipment manufacturers must cater if they wish their equipments to deliver maximum efficiency.

Tinted Film Perfected for Sound Movies

A NEW emotional range opened up to the sound motion picture art with the announcement, at the semi-annual meeting of the Society of Motion Picture Engineers in New York, that film tints have been worked out which will not destroy the sound-reproductive qualities of the film and which can closely simulate the lighting of any interior or exterior scene. The new development means that motion picture audiences soon will see their "talkies" in tints similar, and even superior to, those used by the producers before the advent of sound forced the pictures back into the neutral gray tones of the early days of the industry.

The announcement occurred in a highly technical paper read to the Motion Picture Engineers by Loyd A. Jones, head of the Physics Department of the Eastman Laboratories, the man who is principally responsible for working out the tints.

Affects Sound-on-Film

The development of the new tints does not mean that sound pictures will go into natural colors—which so far have met with other technical difficulties that have prevented their common use with sound. What it does mean is that the sound-on-film systems of articulate motion pictures (Movietone, Photophone, etc.) will be enabled to project scenes in the all-over tints that give the blue of the sea to views needing that quality, the delicate orange of peachblow to close-up love scenes, a cheerful glow to firelit interiors, yellow brilliancy to sunlit scenes, emotionally cool green to the forest, repressive dark blue to murky night views, and the ceremonial color of fleur de lis to pompous occasions of ritual.

The future that Mr. Jones sees in the combination of tints with sound motion pictures, as contained in the introduction to his paper, is that "careful study and experimentation may lead to the development of this language or symbolism into a powerful emotional tool in the hands of the master motion picture dramatist."

Although some tints have long been in use with the silent motion pictures, the tints now perfected for sound pictures are more delicate and have a variety twice as great as the soundless tints. Mr. Jones's announcement listed sixteen tints and a neutral seventeenth which imparts a silvery tone to scenes that would ordinarily be left untinted. The tints in use for silent motion pictures were only eight in number.

The new tints are spaced approximately equally along the gamut of visible colors, separated one from another by about four numbers on the standard Ridgeway Hue Scale, or, in common terminology, about eight just perceptible hue changes apart.

The process of printing on tinted positive sound film is no different from that involved with untinted film. The tints reside in the "raw" positive film as it is received at the studio laboratories.

Essential Rays Go Through All Tints

The reason tints have not previously been usable for sound picture prints has been that the color in the film stopped the necessary light from passing through the "sound track" on the edge of the film and from actuating the photo-electric cell which is the heart of a sound reproduction system. The secret of why the tints described can be used in sound reproduction was revealed in a demonstration by Mr. Jones.

The compounder of the new tints held up to the light, before his audience, sections of film in the various tints, ranging from a pale yellow to deep purples. He superimposed the tints, selected at random, upon each other, in piles of six or eight. Through the various combinations light of one color always penetrated—blue-violet, the color to which the photo-electric cell is most sensitive.

In other words, the secret of the new tints is that each, whether it appears to have any blue-violet in it or not, and at whichever end of the spectrum it occurs, was compounded with enough of the essential color in it to transmit the rays necessary for sound reproduction, based on spectrophotometric measurements. Many months' laboratory work has been required to accomplish the mixing of tints which would appear one color on the screen and yet might actually contain a color diametrically opposite on the circle of the color chart. Further difficulties had to be overcome to assure that sound reproduction would be uniform throughout the whole scale of seventeen tints.

Follows Sound Negative Invention

The perfection of tinted positive films for sound reproduction follows closely upon the development, also by the Eastman Kodak Research Laboratories, of a negative film stock produced especially for sound recording, to replace in the camera the ordinary pictorial film mostly used heretofore for the purpose. Tints, of course, are used only in the positive film that goes through the projector.

Whereas the new positive film is designed to let pictures appear in tints without impairing the sound values, the recently produced negative is expected to pave the way for a definite further improvement of

(*Continued on page* 28)

Application of Tints

SUPPLEMENTAL to the accompanying description of the new film tints are the following excerpts from Mr. Jones's paper which will serve to convey an idea of how the tints are applied by a director in the shooting of a picture. These extracts are a list of the psychological effects believed to spring from the tints in combination with the action on the screen:

Tint No. 17, *Argent*: A hueless color, silvery gray showing no chromatic characteristics. May be regarded as the zero or starting point on the scale of saturation or color strength. It is very necessary as a means of establishing a visual accommodation in terms of which a hue may be appreciated by contrast. It may be used to fatigue the eye to the point of monotony after which the presentation of a hue will have enhanced effect.

Tint No. 6, *Sunshine*: A clear, brilliant yellow approximately complementary to sky-blue, therefore quite closely matching subjective color of sunlight when seen in contrast to blue sky. High visual transmission, 83 per cent; particularly adapted for use on scene with brilliant sunlight conditions. This color is definitely warm, but not to same extent as *Candleflame, Firelight,* and *Afterglow,* which make with this color series increasing progressively in warmth. Mildly stimulating, suggesting mood of lively interest and attention, but not high excitement or nervous tension.

Tint No. 5 *Candleflame*: Pastel orange-yellow. Slightly lower in transmission (75 per cent) than *Sunshine,* giving a screen more orange in hue and lower in brilliance. Somewhat warmer than No. 6. By objective association useful in inducing rather mild mood reactions—coziness, comfort, intimacy, well-being, peace and plenty, etc.

Tint No. 3, *Afterglow*: A soft rich orange color, probably the warmest color of the series. Appropriate to exteriors at dawn and sunset, lending an atmosphere of warmth and intimacy stronger than firelight. Should excite mood reactions in general connected with luxury, wealth, security, and relatively strong affections. Indicative of repose, ambitions attained, accomplishment, and similar psychological aspects of maturity.

Tint No. 2, *Peachblow*: A delicate flesh pink. Has a small, but definite blue content, somewhat less warm than *Afterglow.* Adapted to rendition of close-ups where it is desired to do full justice to feminine beauty. The hue and saturation suggest the glow of life.

Tint No. 1, *Rose Dorée*: Deep warm pink suggesting sensuousness and passion. Amorous, romantic, and exotic. In keeping also with feeling of happiness, joy and excitement.

Tint No. 7, *Verdante*: A pure green, rather pastel in character. The hue of spring foliage suggesting directly trees, grass, and vernal landscapes. By subjective association typical of youth, freshness, unsophistication, innocence, etc. Only slightly warm, but definitely not cold. It is very close to the neutral point in the warm-cool scale.

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PACENT REPRODUCER SYSTEMS

Applicability of Stereoscopy to Motion Pictures*

By LEWIS W. PHYSIOC

Tec Art Studios, Hollywood, California

THE progress being made in some of the color processes and the revival of interest in the talking pictures have elicited the statement from many sources that "the next step forward is stereoscopic motion pictures," which will complete the system of reproducing artificially all of the elements of dramatic art, i.e., speech, action, form color and solidity.

This discussion is not intended as an exposition of the theory of stereoscopy because the subject is familiar to most of the scientific staff of the picture business. It has been suggested, however, that it might be well for this Society to go on record in establishing a few facts for the benefit of those who might hold too lightly a serious problem, or who still cherish the idea of some system for producing stereoscopic motion pictures that might be acceptable to the public. Nor is it our wish to deny the possibility of what we call a practical solution of the problem.

The study of stereoscopy antedates by many years even the art of photography. Leonardo da Vinci selected from the common observation of this phenomenon two well-defined elements in the art of picture making: those of stereoscopy and perspective. Therefore, these two subjects were merely matters of curious interest to the more observant minds; but da Vinci made a deep study of them and deduced the laws governing them.

Also important was his observation of the effect of pseudo stereoscopy, i.e., in viewing a picture with one eye, placing the eye in as nearly as possible the actual point of sight. This discovery was so important that at the present day artists delight in viewing well-rounded pictures or photographs from this "point of sight." Errors of draughtmanship, camera location and the choice of focal length are often traceable to a lack of appreciation of this simple but important expedient for testing perspectives.

Classification of Elements

The word "stereoscopy" is derived from the Greek, *steros,* meaning solidity and relief, but the following classification of the numerous elements associated with the phenomenon suggests its inadequacy:

1. *Perspective.* The apparent diminishing of the size of objects, the converging of parallel lines to the so-called "vanishing point." This branch of art has furnished such a beautiful application of mathematics that infallible calculations may be made of objects from the point of sight, their relative distance from each other and their dimensions.

2. Common experience: dating from the conscious period of babyhood, and by which we measure distances by judging the juxtaposition of objects and the overlapping of each other in the field of vision. This is one of the earliest provisions of nature for self-preservation.

3. The physiological construction of the eye.

4. The mental reaction to this physiological stimulus.

These various elements combine to produce the phenomenon stereoscopy, which in turn is divided into several degrees:

MUCH has been heard of late about the applicability of stereoscopy to motion pictures, and the flood of publicity that has been released on the subject gave rise to hopes that some energetic worker had ceased talking about the matter long enough to lay the groundwork for a real contribution to the art. That such hopes were utterly in vain is indicated by the non-appearance of any really worthwhile contribution and the uninterrupted flow of valueless comment on the subject.

Distinguished from the usual run of information on the subject is the accompanying article by Lewis W. Physioc which presents an array of elementary facts on stereoscopy which must be considered by any serious worker in the field. Mr. Physioc's article was presented at a S. M. P. E. meeting last year, and it naturally was phrased for consumption by the Society membership. Nevertheless, every progressive projectionist should apply himself to a careful reading, and re-reading, of the article, and should spare himself no trouble in the matter of employing reference works in order that the points enumerated in Mr. Physioc's discussion be clarified a bit. We found the discussion extremely interesting, and we haven't the slightest doubt but that a little intensive application will bear similar fruit for our readers.—The Editor.

A. *Complete Stereoscopy*: the full effects of binocular vision among individuals possessed of a high degree of development of the physiological requirements and a perfect mental reaction.

B. *Pseudo Stereoscopy*: the limits of monocular vision, or even individual efficiency in binocular vision, and various effects produced in monolens pictures.

C. *Direct Stereoscopy*: by which we measure the dimensions of a single object, its forms, etc., independent of its surroundings.

D. *Indirect Stereoscopy*: by which we determine the dimensions, forms and relative distances by comparison with their surroundings. This is due to the unconscious appreciation of associated objects outside of the so-called "yellow spot" when focusing on a given field. Indeed, it is questionable whether there should be such a classification as "direct stereoscopy," for the oscillation of the orb is such an involuntary, independent agency, and the scope of the yellow spot is so great, that in viewing even a tiny spot against an absolutely neutral background it is difficult to maintain a fixed point of sight.

This directness is supposed to be maintained in proportion as we limit the field of vision, but the gaze is very obstinate when an effort is made to keep it on so small a point as a pencil dot. Even when studying a sphere against a black background (the supposedly ideal example of direct vision), the gaze shifts from one area of the surface to another and keeps up a continual process of comparison by indirection.

A review of this very limited consideration of the elements of the subject will demonstrate the problem confronting the experimenter in this branch of motion pictures.

Present Methods Impractical

Some may seek to discount our pessimism by reciting the fact that they have witnessed demonstrations of stereoscopic motion pictures. This is true, and in reviewing the various methods by which those pictures were made we consider the obvious mechanical and mathematical propositions upon which experimenters have agreed for years. We refer to the necessity of the picture corresponding to the vision of the right eye being neutralized while the left functions, by means of shutters or spectacles, each eye being furnished with mediums of complimentary colors; both expedients depending upon the persistence of vision in associating the two images in the brain, and in lieu of the prisms or reflectors of long established methods.

These pictures have been interesting but costly experiments and of no commercial value, for several reasons. First, because they depended upon the co-operation of the audience, and the public is a cruel, impatient patron or partner when it is expected to share the difficulties of an enterprise.

Secondly, they represent a very poor patent protection. Most of the patents granted on devices for making stereoscopic motion pictures show very little originality and nearly all embody the first principles of the early days, even of the times when drawings were viewed in simple instruments like Elliot's stereoscope.

(*Continued on page 23*)

*S. M. P. E. Trans. Vol. 12, No. 36.

The Vallen Automatic Mask

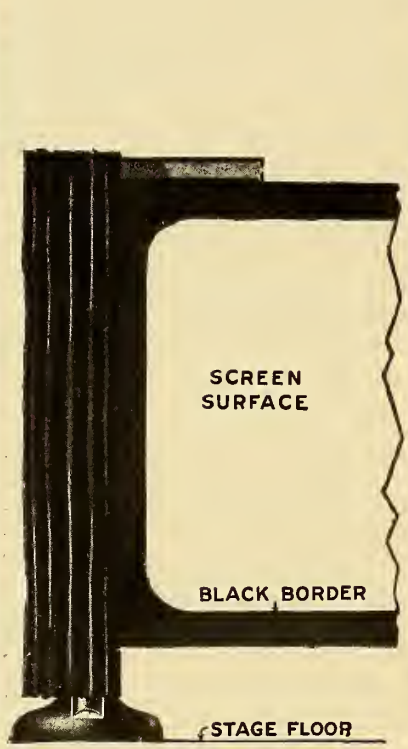
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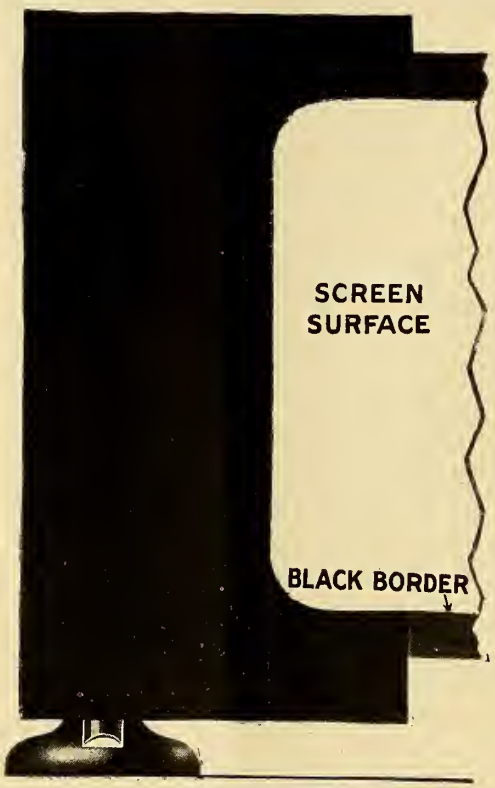
Pressing a button operates Mask in either direction.

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Helm Thermo-Gas

Charles A. Helm, a member of Local Union 160, Cleveland, Ohio, has recently been granted a patent on a fire extinguishing apparatus which is attached to the projector. A description of this new device is given below, consisting of extracts from U. S. Patent No. 1,696,800, which was issued to Mr. Helm on December 25, last.

THIS invention relates to new and useful improvements in fire extinguishing apparatus or means. One object of the invention is to provide an apparatus or means of the type indicated which will be capable of volatilizing a fire extinguishing liquid so as to generate a large volume of fire extinguishing gas rapidly and continuously during the progress of a fire and independently of the heat produced by the burning material.

Another object of the invention is to provide means of the character indicated especially designed to be used in conjunction with a machine or the like, which in its normal functioning produces a degree of heat sufficient to constitute a fire hazard, and having means for utilizing the heat generated by the machine for volatilizing the fire extinguishing liquid.

With these objects in view and with the intention of providing for the securing of other advantages which will be described later, the invention comprises the new and improved fire extinguishing means hereinafter described in the specification, particularly pointed out in the claims, and illustrated in the accompanying drawings.

There is provided a volatilizing element, positive means for heating said element, means for supplying a volatile fire extinguishing fluid to the element, and means for discharging the gas generated by the volatilizing element.

In the accompanying drawings, wherein several ways of applying and carrying out the invention are illustrated, Fig. 1 is a side elevation of a moving picture machine with the invention applied thereto; Fig. 2 is a detail view in perspective on an enlarged scale of a portion of the picture machine showing the general arrangement of the device; Fig. 3 is a view in elevation of the volatilizing element; Fig. 4 is a section on line 4—4, Fig. 3; Fig. 5 shows a modified form of the volatilizing element: Fig. 6 is a section on line 6—6, Fig. 5.

Method of Attachment

Again referring to the drawings and particularly to Figs. 1, 2, 3 and 4, in which like numerals indicate the same parts, 10 represents the base of a moving picture machine, 11 the head of the machine, which carries the usual feeding mechanism (not shown) for the film and through which the film passes when being exposed. The film boxes for the rolls of film are indicated at 12, and at 13 is indicated the lantern box which carries the customary projecting lamp, lenses and adjusting mechanism (not shown). The electric circuit is indicated at 14 and the controlling device therefore at 15 and 16. The film window is shown at 17, the shutter at 18 and the heat shield at 19, see Fig. 5.

When applying this fire extinguishing apparatus to a moving picture machine, it is preferable to remove the device known as the heat shield 19 which is mounted on the head of the machine between the lens and the film window, where the film is exposed in the light from the projecting lamp. As is well known, the object of the heat shield is to protect the parts of the head adjacent to the film window from the heat developed by the excess light rays from the projecting lamp. During the operation of the machine, the heat shield becomes highly heated due to the impinging of the excess light rays thereon.

After removing the heat shield 19 from the head 11, there is substituted the volatilizing element, which in the drawings is indicated by 20. When applying the volatilizing element to a moving picture machine, it is preferable that it shall conform in its dimensions and configuration to those of the ordinary heat shield so that it may be readily substituted therefor.

The volatilizing element 20, therefore, in this instance comprises a thin rectangular shaped casting which is provided with a central aperture 21 for permitting the light rays to pass therethrough so as to impinge on the film. The casing or volatilizing ele-

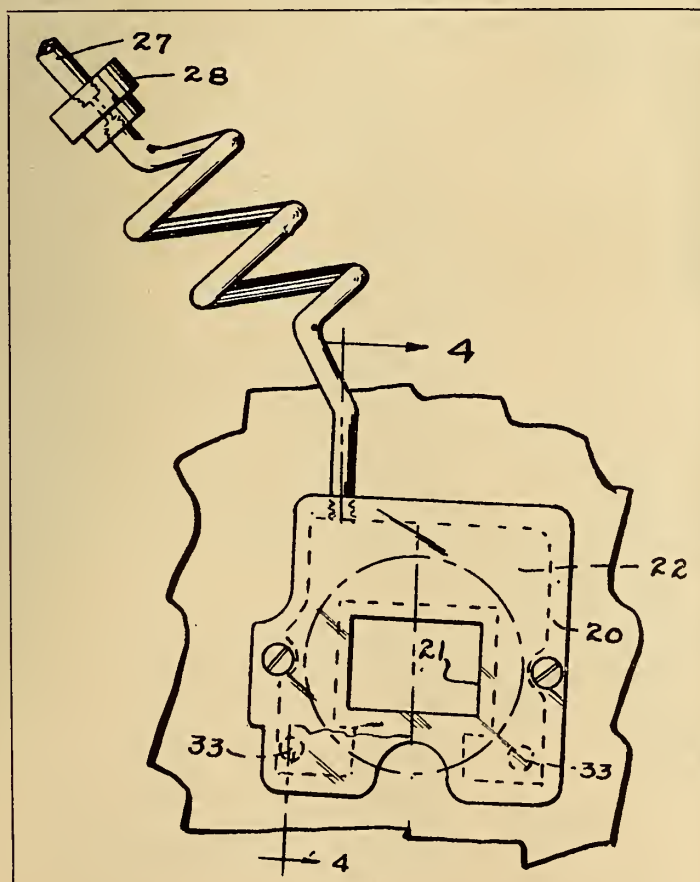


Figure 3

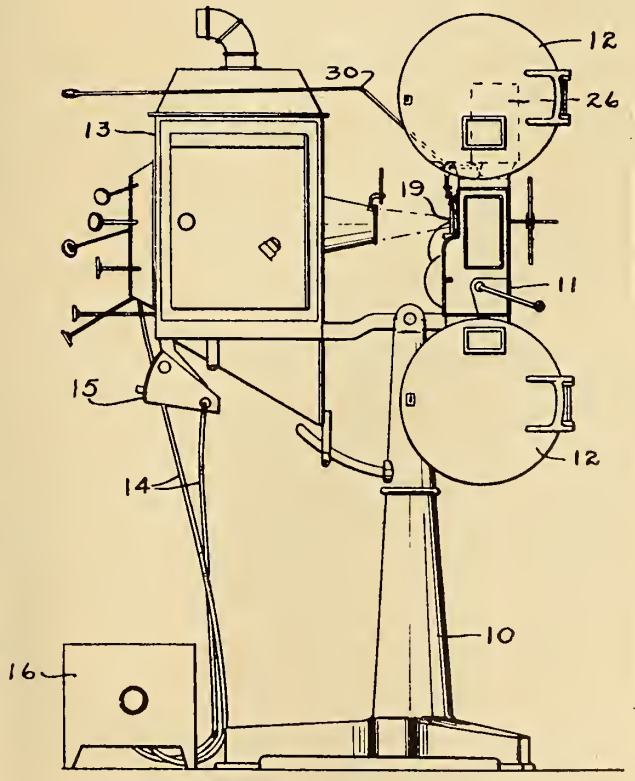


Figure 1—Showing projector mounting

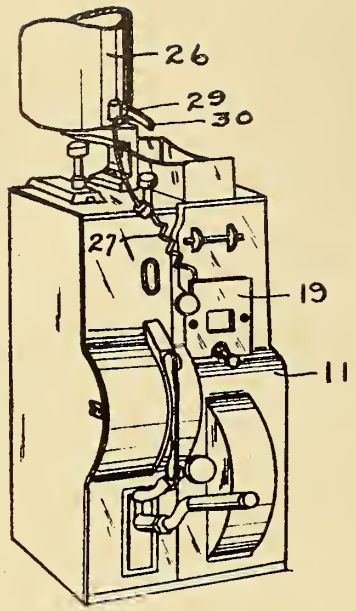


Figure 2

ment 20 is provided with a chamber 22. This chamber 22 is provided with an inlet opening 23 and one or more outlet openings 24.

On any suitable portion of the frame is mounted a closed container 26 for holding any suitable fire extinguishing liquid, preferably carbon-tetrachloride. The fire extinguishing liquid may be kept under a definite pressure either by the use of compressed air or other suitable means and the object of having the liquid under pressure is that it may flow freely from the container when desired. A suitable pipe or conduit 27 extends from the container 26 to the inlet opening 23 of the chamber 22 in the volatilizing element 20. The conduit 27 may comprise a heat insulating section 28 to prevent the heat from the element 20 being conducted to the container 26.

The conduit 27 is provided with a suitable valve 29 which may be operated by means of a rod 30 so arranged that it may be readily grasped by the machine operator. A conduit 33 is connected with the outlet opening 24 and as shown extends direct through the wall of the head portion 11 of the picture machine, but this conduit may be branched and carried to as many portions of the machine as desired.

Operation of Apparatus

The operation of the fire extinguishing apparatus is as follows:

A quantity of carbon tetrachloride is put into the container 26 and a definite pressure established on top of the liquid. After the machine has been in operation for a short time the walls of the chamber 22 of the volatilizing element 20 become highly heated. If the film takes fire, which is generally caused by some interruption in the feed of the film permitting a portion of the film to be unduly subjected to the action of the focussed rays of light, then the operator opens the valve 29 in the conduit 27 by manipulating the rod 30. The carbon tetrachloride liquid is forced down through the conduit 27 and enters the heated chamber 22. The liquid is immediately vaporized and escapes through the outlet 24 and the conduit 33 and enters the head 11. As the vaporizing surface of the chamber 22 is relatively large compared to the size of the outlet opening 24, considerable pressure is built up in the chamber 22 and the gas escapes from the conduit 33 with great force. The gas entering the head 11 drives the air away from the burning film and the carbon tetrachloride atmosphere established in the head 11 smothers the fire. As the boxes 12 which hold the film rolls are in open communication with the head 11, the carbon tetrachloride gas will enter the film boxes and smother any fire which may have been communicated to the film rolls.

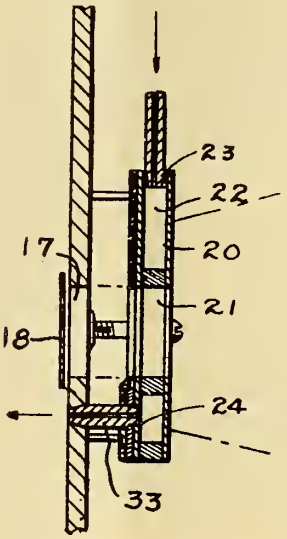
In Figures 5 and 6 is shown a slightly modified form of the apparatus just described; the modification consisting in the use of a section of tubing 20' for the vaporizing element. This tubing 20' is carried across the face of the regular heat shield in the path of the excess light rays. The heat shield is indicated at A and the light aperture at B.

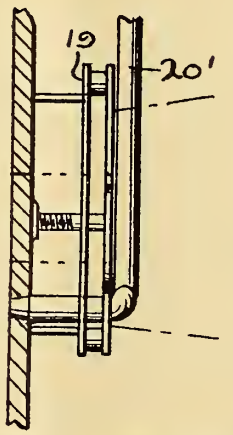
What the Invention Claims

Mr. Helm: "I do not desire to limit the scope of my invention to the embodiments herein described and shown in the drawings, as the invention may be carried out in many forms and applied in various ways.

"What I claim is:

"1. In an apparatus of the character described, in combination with a moving picture machine, a volatilizing element arranged in the path of a portion of the light rays of a projecting lamp so as to receive heat from said rays, means for supplying a volatile fire extinguishing medium to said element and means for directing the volatilized fire extinguishing medium in the path of the film carried by said moving picture machine.





Above—Figure 4. Below—Figure 6

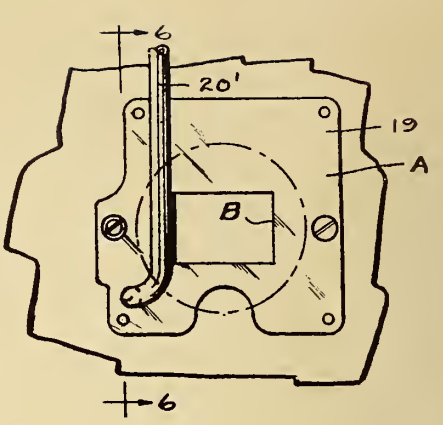


Figure 5

"2. In an apparatus of the character described, in combination with a moving picture machine, a container arranged in the path of a portion of the light rays from the projecting lamp so as to receive heat from said rays, means for supplying a volatile fire extinguishing fluid to said container and means for directing the resultant gas from said container into the path of the film carried by said moving picture machine.

"3. In an apparatus of the character described, in combination with a moving picture machine, a volatilizing element arranged in the path of a portion of the light rays from the projecting lamp so as to receive heat from said rays, said volatilizing element having an inlet and an outlet, means for feeding a volatile fire extinguishing fluid to the inlet of said container under pressure and means for conducting the generated gas from said container to various parts of the moving picture machine to extinguish fire in and around said machine.

"4. In an apparatus of the character described, in combination with a moving picture machine, a volatilizing element arranged in the path of a portion of the light rays from the projection lamp so as to receive heat from said rays, means for feeding a volatile fire extinguishing fluid under pressure to said volatilizing element and means for directing the vaporized fluid in the path of the film and into the film compartments."

International Projector Expands

International Projector Corp., manufacturers of Simplex projectors and other motion picture apparatus, has acquired a six-story building adjoining its present plant at 90 Gold St., New York City. Work on a four-story addition to the new building will begin shortly and when completed will give the company a total of 150,000 square feet of factory space, practically double the space now available.

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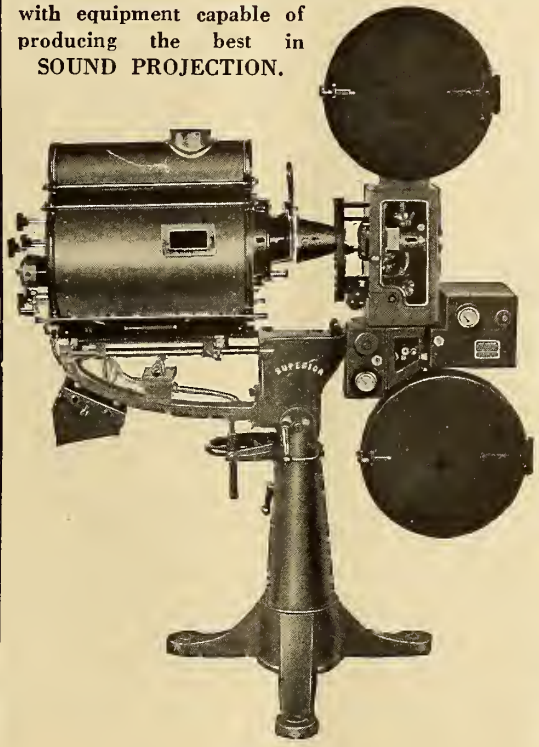
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Indicating Instruments

By NAT SHAUB

Local 306, New York

ALL indicating instruments used in the projection room, whether they are called voltmeters, ammeters, milliameters or special indicators, are galvanometers, calibrated for the particular work they are to do. When used as voltmeters they are used with resistances in series with the external circuits, the value of the resistances depending upon the range of the instrument (maximum reading). When used as ammeters or milliameters, a shunt or "by-pass" for the line current is used.

The value of the shunt, which is considered as a resistance across the instrument, depends upon its range. These galvanometers vary considerably in sensitivity, by which is meant the amount of current required to produce a full scale deflection of the indicating needle, i.e., from zero to its maximum reading.

It is quite obvious that, whereas we may countenance an instrument requiring an actuating current of .01 amp. for an ammeter having a range of 300 amps., an actuating current of that magnitude is quite out of the question for an ammeter having a 2 milliampere range.

Range of Instruments

Some of the instruments used by projectionists have facilities for varying their range, and in some instances the instrument, because of the selection of proper binding posts, may be used as a voltmeter or ammeter. An example of that type of instrument is the one supplied by E.R.P.I. to the theatres equipped with Western Electric sound picture apparatus. A description of this instrument may clear up a few points about it.

It has a common terminal to which connection is made regardless of whether the instrument is to be used as a voltmeter or ammeter. As a voltmeter, it has ranges of 3, 15, and 150 volts (marked on the binding posts). By the use of extra resistance in series with the voltmeter, its range may be increased to any value. The resistance (called multiplier) supplied by E.R.P.I. extends the range of the instrument to 450 volts. As an ammeter it has ranges of 3, 15 and 30 amperes, respectively.

The scale of instruments may be found to be calibrated for the different ranges, or again it may not. But a little thing like that should not prevent us from using it correctly.

In the device under consideration, calibration has not been made for the 15-volt range, either as a voltmeter or ammeter. By determining the "factor" for any particular scale the correct reading may easily be ascertained. The factor for any particular range is the ratio of the range one desires to use over (divided) the total number of divisions in the scale. To get a reading, the number of divisions (spaces) on the scale, as shown by the deflecting needle, is multiplied by the factor. For example:

Correct Computation

Using the 15-volt scale, let us assume that the needle shows a deflection of 17 divisions. Since there are 30 divisions on the scale the factor for that range is: 15/30 = 1/2. The correct reading, therefore, is 17/2 = 8 1/2 volts. Likewise, the maximum range of the voltmeter used alone is 150 volts; used with the multiplier the range is 450 volts. The factor for the 450-volt range (450/30) is 15, which, again, means that when using the 450-volt range every scale division must be multiplied by 15 to obtain the correct reading. We shall next consider the galvanometer.

In principle the galvanometer is an electric motor. A permanent magnet of horseshoe type serves the same purpose as the fields in a motor, namely, to supply the magnetic field between the pole pieces. The pole pieces are shaped so as to distribute the magnetic field between them and insure a practically uniform intensity between them, as a uniform field is a very important attribute to a good instrument.

It is essential that the scale deflection be proportional to the current flowing through the armature of the instrument. Roughly, the armature consists of a rectangular frame of light material (usually aluminum), having wound upon it a number of turns of very fine wire. The frame is mounted on pivots which fit into jewelled bearings. The armature is placed between the pole pieces of the horseshoe magnet, and the ends of the armature coil are connected to springs at opposite sides of the armature.



Field Around Wire Carrying Current

Action of the Instrument

These springs serve a twofold purpose: (a) as a means of connecting the armature to the outside circuit, and (b) as a means of bringing the needle back to its zero position after the current has stopped circulating through the instrument. A few elementary facts about the action of the instrument will be useful.

As stated previously, the magnetic field between the pole pieces of the permanent magnet is of uniform intensity. A conductor, without current, placed in the field will not affect it, as the field still will remain uniform. But, if a conductor carrying current is placed in the magnetic field there will be interaction between the two magnetic fields, and there will be a force exerted on the conductor which will tend to move it. The diagram will make clear the action described here.

By examining the diagram closely it will be seen that the magnetic lines of force of the conductor and of the magnet strengthen each other above the conductor. (This is really a state of opposition to each other, as they weaken each other at the bottom of the conductor.) The results of the two forces will tend to move the conductor down. Considering the lines of force as stretched rubber bands will make it easy to understand the force upon the conductor.

On the armature of the galvanometer there are two forces acting in opposite directions, and since the armature is free to move, it will turn on its axis.

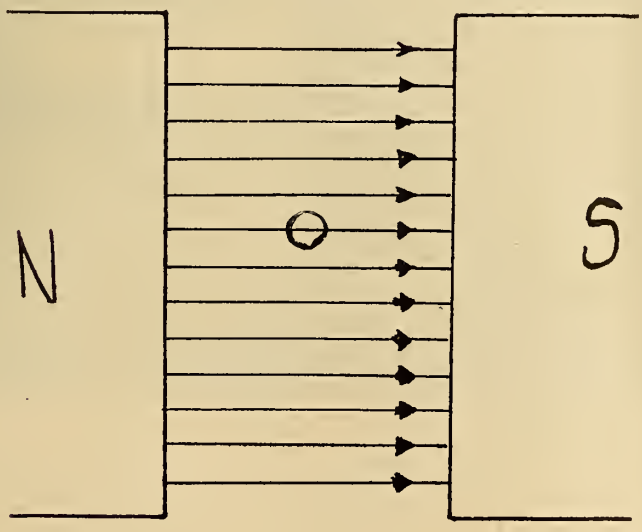


Diagram of Field B, showing wire without current in the uniform field.

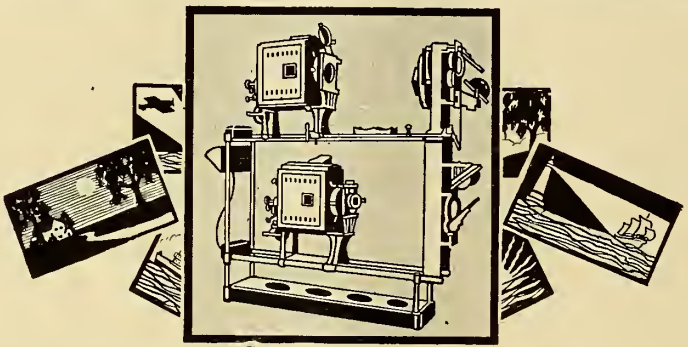
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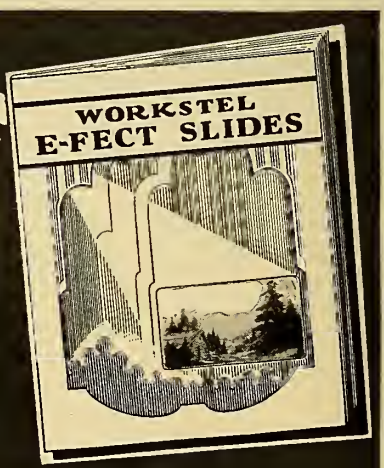
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Applicability of Stereoscopy to Motion Pictures

(*Continued from page* 15)

The only unique device shown is one based on the oscillation of the eye and produces only pseudo stereoscopy.

Many other experiments have been suggested by these pseudo effects, such as the oscillation of the eye in monocular vision or the rapid and even change of parallax, observed in pictures taken from an aeroplane circling over tall buildings or from a boat moving along a winding stream, or from da Vinci's effect of viewing a picture from the proper point of sight. These effects have been attempted in motion pictures by placing a camera on a platform moving in an arc, the radius extending somewhere back of the set, by which means the foreground objects are continually measured against those in the background.

Other experiments provided queer lenses placed on front of the main objective or means for reflecting the image into the camera, special screens that insist on one person in the audience sitting in the proper place, all of which are worthless propositions.

THROUGH ignorance of the subject, there have been misrepresentations which resulted in the spending of millions of dollars in perfecting a system of stereoscopic motion pictures, and it is due those concerned in that project to state that we do not believe there has been any claim of true stereoscopy in a wide range picture taken with a single lens or without the aid of optical devices for the observer.

Projection the "Real" Problem

The name "natural vision" has probably been erroneously used in designating a monolens picture covering an angle more nearly equal to the range of the human eye than that of the standard motion picture. Even this system comes within the realms of artistic judgment as to how much of a subject should be presented to furnish excellent composition, for there is no pictorial value in scattering our vision over a tremendous area. It is interesting to observe that the difficulty lies not in the taking of stereoscopic motion pictures, but that *the real problem is in projecting them*, which brings us to a consideration of the much disputed points suggested in sections 3 and 4, i.e., the psycho-physiological elements.

Outside of the body, and even as far as the two retinae, we have a satisfactory explanation of the phenomenon of stereoscopy, arrived at by reductive reasoning aided by many branches of mechanics and mathematics; but when we leave the retina we are to suppose a sort of psycho-physiological stereoscope set up in the brain, which at present is *conveniently explained* by assuming that the optic nerve transfers the retinal stimulus to the brain. We are confronted with the proposition of two flat images, similar to those on the ground glass of an ordinary camera, falling upon the retinae and associated in some manner in the optic thalami, then transmitted through the optic radiation to the visual centers and other parts directly connected with the perception of this effect, particularly the memory chambers. (It has been shown that people not endowed with a well developed perception of stereoscopy have faulty memory.)

Vision a "Heterodyne Action"

Up to the present time the functions of the rods and cones and the Müller fibres of the eye and the optic tract and the neurons connecting the retina to the brain, have been imperfectly understood. Delmar A. Whitson advances a theory that insinuates the subject into the ever broadening realm of radio, by observing, in the construction and association of the rods and cones, of the eye, a system that suggests an electronic relation to form a sort of receiving set.

According to physical laws, any instrument capable of receiving a wave, also has the power of emission. Curiously enough, this theory appears to be substantiated by a series of experiments conducted by Dr. Charles Russ, by which he caused a delicately balanced electrical instrument to respond, actively, to the direct glance of the eye. Whitson's theory provides the assumption that the effect of vision is the result of a heterodyne action produced by the waves of the eye challenging those directed towards the eye. It has been established that in both sound and radio waves the heterodyne sets up a long beat note and that this beat wave may be responsible for the effect of vision. This does not seem to conflict with the accepted theory of light, for we know that the eye

(*Continued on next page*)

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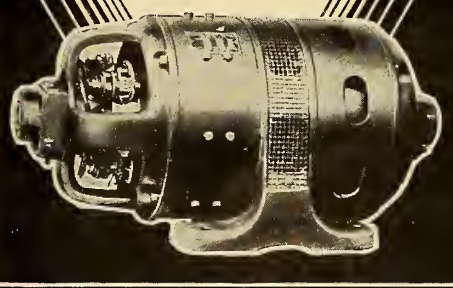
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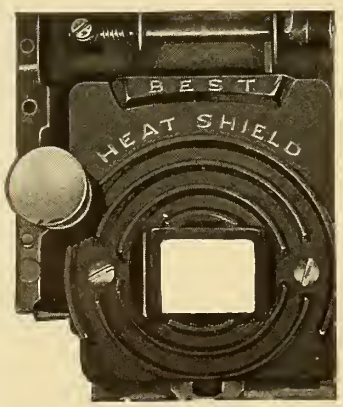
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Applicability of Stereoscopy to Motion Pictures

(*Continued from preceding page*)

is not constructed to receive the full rays of the spectrum.

This theory might suggest that stereoscopy is the result of a very complex system of radiation from near and remote planes, limited in monocular vision and multiplied in binocular vision; and, in fact, the more complex the radiation the more pronounced the effect of stereoscopy. It might also agree with the observation that perception of stereoscopy varies in individuals, due to the individual pathological condition and arrangement of the rods and cones. And further, the idea of the eye emitting a wave agrees with the simplest explanation of the operation of the brain "which is in its highest activity, the organ of consciousness or mind, and its general function is that of furnishing the most complex and extensive outgoing stimulation of muscles and other active tissues as a response, more or less immediate, to the most complex and extensive sensory stimulation."

The pyscho-physiological consideration has so engrossed some stereo enthusiasts that it has been hinted that some progress has been made in attacking the problem from this angle. But, unfortunately, we have been furnished no details by which we may judge the merits of such a conception.

However, the more conservative students reflect the attitude of the aforementioned Dr. Russ: "supremely skeptical of any matters that do not lie within the scope of material proof, to be shown by touch, sight and measurement."

Pseudo-Stereoscopy Denied

This present consideration revolves around the so-called pseudo effect which has puzzled so many observers, and we revert to it as a concluding idea. As to the da Vinci effect, of viewing a picture with one eye, we believe that this is merely a matter of pyschosis in finding a perfect adjustment of the perspective point of sight; but we contend that there is no such effect as pseudo stereoscopy as regards vision, and that even in monocular vision the effect is complete but is limited to the degree of parallax which the single eye is capable of producing.

In viewing with one eye a group of small objects at very close range, we experience a perfect sense of third dimensional displacement, and the effect is reduced as we remove the group from the eye. Likewise, in viewing objects at a great distance with both eyes, the field flattens in proportion to the distance of the objects to the eye. In single eye vision, at very close range, if we consider that every point of a lens is an individual lens, with the iris providing a minute inter-pupilary distance, a very complex system of triangulation is set up. However, this is only noticeable at an extremely short focus, and it is probably for this reason that it has been overlooked as an important factor in the study of stereoscopy. . . .

In conclusion we can only center our

Projection a Specialized Art

(*Continued from page* 11)

the master of our photographic destinies." Daniel B. Clark, formerly President of the American Society of Cinematographers, is also an earnest believer in good projection and a friend of the projectionist. He stressed the importance of properly designed projection rooms and gave much space to projection in the *American Cinematographer.*

The entire front page of the magazine section of a recent issue of the Washington (D. C.) *Star* was devoted to projection under the heading "Operator Becomes Ruling Figure in Great Screen Revolution." This is probably the first time any newspaper has devoted so much space to the projectionist and indicates that the public is beginning to recognize the importance of his work. Through a properly organized and systematized publicity campaign many other papers would carry articles of a similar nature, and the Projection Advisory Council plans to develop this work.

The S. M. P. E. now has a large number of members who are practical projectionists* and they are listened to with respect and attention when they address the Society. Their papers and discussions appear in the Transactions as positive evidence of the part they are playing in the meetings of the Society.

WITH the introduction of sound pictures the projectionist found himself facing new problems. These have been splendidly presented in a paper read by Harry Rubin, Supervisor of Projection for Publix Theatres, at the Fall Meeting of the S. M. P. E. in 1928. Mr. Rubin prefaced his technical details with the following general remarks:

"The introduction of sound pictures necessitated the redesigning and reconstruction of projection rooms as the space allotted to this department is inadequate even in many of the newest theatres. It would be well for architects in future to be fully informed regarding the requirements of a modern projection room. In many instances it was necessary to demolish walls which did not conform to fire regulations and to construct new ones with similar restrictions. It is obvious that this meant much work, expense, loss of time and interference with the work of the projectionist.

"The need for speed in the installation of sound equipment, and in many instances new projection equipment, constituted a real problem, as no interruption or marring of the program was permitted. Another difficulty of a similar nature was training men for entirely new equipment under rush conditions without interfering with their regular duties. *It is doubtful whether any body of men has been called upon other than in time of urgent necessity to take up the operation of entirely new and delicate equipment with so little preliminary training as the projectionist received in connection with sound pictures.* That he has done so well is a real testimonial to his technical ability and intimate knowledge of conditions in the theatrical field. The projectionist should have ample opportunity to study new apparatus which he is expected to handle. Proper instruction in the operation of new equipment in hardly less an engineering problem than designing the equipment itself.

* Approximately 7%, to date.

hopes in the fact that nature generously provides many means to an end—that necessity frequently solves her problems. Public demand prodding a bright research mind with unlimited laboratory facilities and generously endowed, may solve the problem.

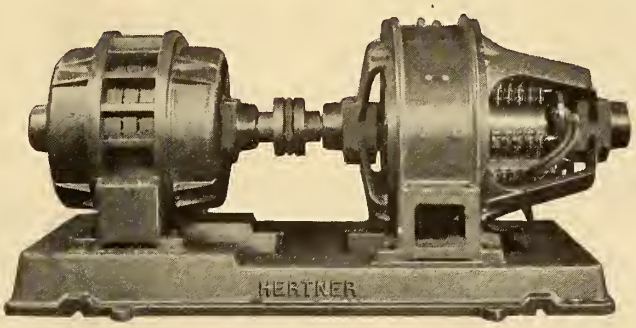
We assume that a satisfactory solution of this problem excludes the use of optical devices by the audience.

The Screen Problem

"There is urgent need for the development of a screen which will permit transmission of sound without sacrifice of reflecting power. Much of the advance that has been made in recent years in the manufacture of screens intended solely for visual projection has been lost through the use of screens now used for sound pictures to facilitate transmission of sound.

"Even with the best screens now in use for sound pictures there is a perceptible loss of light, and it is to be hoped that this condition will be corrected at the earliest possible moment. The quality and quantity of the light is of the utmost importance to the projectionist and the condition here referred to is one of the most serious problems the projectionist has to face at present.

(*Continued on next page*)



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Two New Improvements for the booth

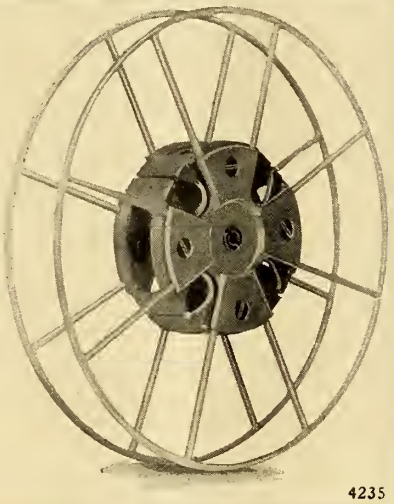
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

National Theatre Supply Company

Branches in All Principal Cities

THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

Three sizes. Eleven inch, $4.75 *F. O. B. Factory.*



4235



THERE are a hundred uses for this soldering iron in a projection room. This new electric iron eliminates the serious fire hazard and saves the time and trouble involved in the use of old style flame-heated irons. It may be used interchangeably with a melting cup or soldering tip, as illustrated. Convenient, reliable and economical.

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FOR

SOUND PROJECTION BOOTHS

FOR PERFECT REPRODUCTION ON THE SCREEN ENCLOSE ALL PORTHOLES WITH

F. S. C.

Genuine Optical Crown Glass Plates

SURFACES WITH PRECISION POLISH—WILL NOT DISTORT THE PICTURE

FISH-SCHURMAN CORPORATION

45 West 45th Street NEW YORK

Projection a Specialized Art

(*Continued from preceding page*)

"Sound volume is mechanically controlled from the projection room and, therefore, the elimination of vibration and extraneous sounds are naturally matters of real interest to the projectionist. Such difficulties, while not the direct responsibility of the projection department, must still be included among the problems of projection in connection with sound pictures."

That the industry failed to give proper consideration to the projectionist when sound was introduced is clearly indicated by the statement made by George Edwards at the same S. M. P. E. meeting:

"There certainly is one thing that has been lacking in the introduction of sound pictures to the projectionists. The outfit comes into the theatre for installation accompanied by an installing engineer. A crew of electricians, wiremen, and often other mechanics are engaged in the necessary construction work in quarters that were crowded even before the installation of the new apparatus. The projectionist's problem is to keep the show running properly and at the same time absorb a lot of necessary information about the apparatus. This is something that should have been supplied long in advance.

Meager Information Available

"It is very difficult to get much information in book form, owing to the changes in apparatus, but I do think that the people putting out sound devices might with advantage follow the lead of the radio manufacturers and supply more information than they have. Each component should be described, its particular function explained and emergency repair methods given in detail.

"The expensive instruction books supplied with the installation are complete, but are entirely lacking in this important information. They tell one to 'keep the batteries charged' and to 'keep the sound gate clean.' It would be far more practical to state what would happen if these parts were not looked after properly.

"I think this is the trouble from the point of view of the projectionist today. He asks the engineer how this works and received such answers as 'Turn this switch, and it will do this,' 'that is an amplifier," etc. There are men who do not know what the filtering system is for. Why don't they? If they know what it is for, they will know when it is working properly. I'm afraid that there has been a disposition on the part of the manufacturers to wrap an air of mystery around the whole thing. There is nothing secret in this business, gentlemen. One may have a circuit one wishes to keep under cover for a while; you don't have to show it to them, but it is very important to show them how to work it.

Secrecy Condemned.

"How many of your engineers have shown a projectionist how to bring a motor up to speed when it persists in running at 50 r.p.m. below the fixed normal speed? It is a simple matter and requires neither great technical knowledge nor ability. The

placing of fuses inside a locked box is an example of how not to do a thing, especially when it is necessary to get a blown fuse replaced quickly. I know of a case where a show was held up for forty minutes due to the inability to locate the fuse at fault. I think a series of articles in our technical press are required. They will help the projectionist, the producers and the manufacturers."

Mr. Miehling: "In connection with Mr. Edwards' remarks I wish to say that I represent Publix Theatres, Inc. We have anticipated the points mentioned by Mr. Edwards, and I am traveling throughout the country to give the information to projectionists which they will need to keep the show running under any conditions. I have found that on reentering the territory where information had been given projectionists, they have not only been able to help themselves but have been able to do justice to sound and projection as it was intended."

The failure to take the projectionist into consideration and the tendency to belittle his work is unfortunate. It is a handicap to him and does great harm to the industry. There is a well established practice of criticizing the projectionist for ignorance, without any effort being made to help him or to realize how hard he is trying to secure the latest and best information about his work.

The Midnight School.

At a recent meeting of a projection society in New York the business session was followed by a discussion on sound failures, their causes and the remedies. Some very interesting experiences were recounted and a lot of useful information gained. A certain point in projection work was introduced and the discussion which followed lasted more than an hour. This was at 3:30 A. M. Many members present had had a hard day's work and had come a considerable distance to attend the meeting.

In what other business do men give up their time at such a time to secure information which will help them in their work? It must be remembered that these men do not own the theatres or have any personal financial interest in the sound outfits. They simply are working for a salary, and upon their skill depends not only the success or failure of the theatre, but the ultimate success of all sound processes. We think the situation unique. We know of no other class of workers traveling in heavy weather and losing their usual sleeping time to discuss ways and means to make business better for their employers, without direct monetary compensation.

A large number of projectionists belong to various projection societies and much valuable information is disseminated through such channels. Authoritative information in this field is not easily secured. The industry is new and conditions change too rapidly to have many standardized sources of information. There should be more educational societies which schedule regular instruction periods for lectures and discussions.

There is a great need for more information regarding visual and sound projection. It is to be hoped that manufacturers of equipment will find some way to provide material for lectures and that more technical data can be supplied. Every projectionist should have a well supplied technical library and carefully read the projectionist publications. It would be advisable to read at least one motion picture trade publication.

Note: The second installment of this report of the Projection Advisory Council will appear in the next issue and will deal with another important angle of projection work—showmanship.

THE LENS THAT PUTS PERFECTION IN PROJECTION



Outstanding Projectionists Indorse

The NEW ILEX F: 2.5

When Ilex first announced the new projection lens F:2.5 we were satisfied in our own minds of the superiority of this remarkable lens with its seven outstanding advantages.

Now—we have the written words of projectionists in all parts of the country telling in glowing terms of the advantages of the new Ilex. We quote:

". . . The Ilex lens does produce exceptionally good results. The focus is very sharp and the definition over the entire field of picture surface was exceptionally noted. We can unhesitatingly recommend the Ilex lens to anyone who might be in the market for a truly high grade lens. . ."

". . . I wish to say that I found the new Ilex Projection Lens F:2.5 to be all that you claim. It projects an A-1 picture. . ."

For those who desire the very finest in motion picture projection, we recommend the new Ilex Projection Lens F:2.5, the most outstanding advance in projection optics in recent years.

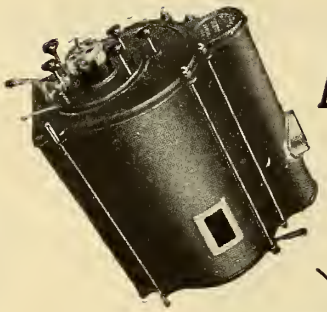
ILEX OPTICAL COMPANY
ROCHESTER, N. Y. (Est. 1910)

An Inside Story

Soap and water is fine for the outside of electric lights, but what about scouring the inside of incandescent lamps which in time may have collected a bit of blackening?

This problem has been solved successfully by the lamp industry in a very ingenious and simple manner. About a teaspoonful of coarse tungsten powder is placed in the large aviation and studio lamps before they are sealed. After the lamp has collected blackening from heavy use, one merely shakes the lamp, thus permitting the tungsten particles to do the scouring job required on the inside.





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The Strong Electric Co.
2501 Lagrange St. Toledo, O.

New Tinted Film for Sound Pictures

(*Continued from page* 13)

the tone quality, since sound photography heretofore has merely made the best of existing types of film.

The work leading to a negative film emulsion with the maximum effectiveness for sound reproduction was along the lines of quantitative analysis of the form of sound waves. Laboratory methods were developed by which it is possible to analyze precisely the variations in density which affect the fidelity of reproduction and to detect distortions in reproduction which are even smaller than those that could be heard by the ear.

The search for the sound negative film, like that for the tinted sound positive, was started in the Eastman Kodak Research Laboratories early in the history of sound-on-film motion pictures.

In the research leading up to the development of positive film tints that would not stop the light rays to which the photo-electric cell is sensitive, work was done by the Laboratories to make a film that was tinted except for the sound track along the edge, which was clear. Such a film was successfully produced; but, because it would make the film productions for which it was used more expensive, further efforts were made to perfect tints that could extend over the whole width of the film.

Negligible Volume Change When Tint Changes

The evenness with which the sixteen tints and the neutral tone let light through to the photo-electric cell is indicated by the fact that between a tint of maximum photo-electric density and a tint of minimum photo-electric density the change in the transmission of energy is equal to only three decibels (energy transmission units), which causes just a barely perceptible change in the loudness of the sound. Between any tints except the two at the extremes the volume change is even less.

The problem of the research leading up to these tints was to attain such evenness of photo-electric density while at the same time covering practically the entire range of the visible spectrum with tints as they appear on the screen.

The fact that this was accomplished means that any succession of tints may be

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used by the motion picture producers in making up a reel, with each mood of the drama aided by a psychologically appropriate color, and yet that no change in sound volume will be noticed when the tint changes on the screen. Indeed, contrary to the case of the tints in use with the silent motion pictures, many of the new sound tints are so delicate that they will simply enhance the moods of the screen and aid the powers of reproductive imagination in observers without making a distinct impression on the consciousness. This is true except in the case of the tints designed to arouse the more violent emotions.

The paper on the subject which Mr. Jones read was accompanied by a demonstration film, prepared by the Fox Laboratories, presenting dramatic scenes and scenic views in the whole range of tints, with a running musical accompaniment coming from the film. In addition, as a further index to the evenness of the tints in photo-electric density, the whole series was run through to the sound of an accompaniment repeated for each tint, which let the volume be compared for the different tints—with no perceptible difference in volume appearing.

Artistic Function Cited

The following conclusions have been prepared by the Eastman Kodak Research Laboratories concerning the artistic relation of tints to motion pictures. This report was made after an exhaustive study of the subject, including the collection and analysis of all the available data relative to the symbolism, language, and emotional values of color.

"It is certain that many of the emotional moods which the motion picture seeks to capture reside in colors rather than in gray tones. Although gray may deepen certain moods of the screen, the peaks of emotion are usually flattened off by it, an effect which is far from ideal. A wider range of both stimulation and depression seems possible through a systematic use of the effective values of different colors. The language of color as applied to the screen is still rudimentary, but the colors do have certain consistent emotional effects well established by psychological tests.

"It is the purpose of the new series of tinted positive films to bring to the aid of the motion picture all the serviceable associations of color tones, to be used where gray fails to support the dominant dramatic mood of the screen.

Simulate Actual Lighting Effects

"The films consist of Argent, a silvery hueless substitute for clear positive, and a series of sixteen chromatic tints spaced approximately equally along the gamut of visible colors and separated one from another by about eight just visible hue steps. In expressive hue values, the series thus provides a complete variety. The color saturation in most cases is relatively low, being adjusted with careful consideration of the psychological requirements so that the resultant color accompaniment operates with a maximum of effect without becoming obtrusive and distracting, whereby it would defeat its own purpose. A high saturation is used in a few of the tints

(*Continued on next page*)

ATTENTION!

All Projectionists!!

Most of you are already the owners of F. H. Richardson's 5th Edition HANDBOOK OF PROJECTION, in two volumes.

A companion book to this edition in the form of Volume III dealing completely with the new subject of Sound Recording and Reproduction is now in preparation and will be ready for publication on June 1st.

Publication is being purposely delayed until that time in order to include certain very important technical data on new equipment which the manufacturer will not be ready to release until then.

There is no use in publishing a book on Sound Projection that is not complete and up-to-date. That is why we are purposely delaying publication—and no projectionist will regret that delay when he sees Volume III.

It will be bound the same as Volume I and II. For this reason every present owner of Richardson's 5th Edition will want the new Volume III to match up and complete his projection library.

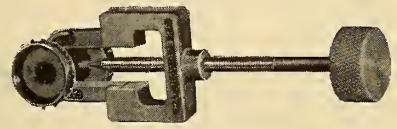
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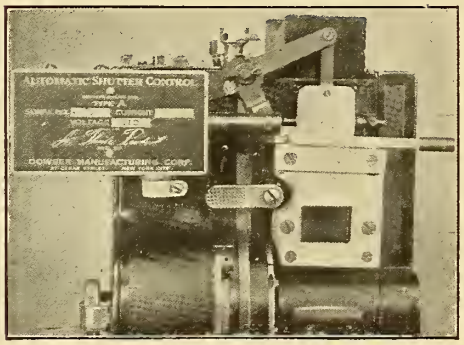
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Akron, Ohio, U. S. A.

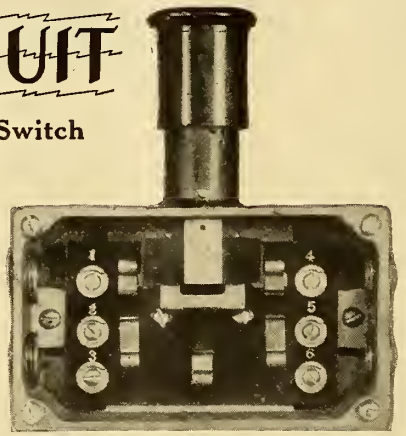
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Spotlighting the Soul

A BEHAVIORIST is one who can tell us why we behave like human beings. The theatrical profession, perhaps scientifically or unscientifically, has applied a great deal of behaviorist theory in doing the job of thrilling and entertaining the world weary. "Spook music" and "lurid lighting" have been handmaidens to the spoken word and the scenery.

Now comes the scientific illuminating engineer with sets of specifications which aim to get at the inner human being through the intelligent use of light, or let us say—illumination. The full influence of clever lighting on the human animal is a subject that is about to receive increasing attention from the electrical fraternity.

Plumbing the Emotional Well.

M. Luckiesh, nationally known illuminating engineer, sees in the rapid development of lighting a new goal for his profession. A goal that will have to do with psychology and psychoanalysis rather than with physics and engineering. Mr. Luckiesh, declaring that human eyes are "doorways of light," admonishes his profession that it must develop a "seeing power," and that the foundation of the new practice must be based on a desire to go into the intricacies of feeling, affections, emotions, sentiments, volitions and associations.

"Scientific researches," he states, "are now working upon this foundation. Already there is much material which can be used by the lighting specialist who recognizes his responsibility and opportunity in applying this new knowledge for the benefit of a half-seeing world."

New Tinted Films for Sound Pictures

(*Continued from preceding page*)

which are designed to stir the more violent emotions.

"One of the principal merits of the tints is that in hue and saturation they can closely simulate the actual lighting of any exterior or interior scene. Lighting of realistic color content is a primary emotional source to which the motion pictu e has never before had such free access. The motion picture must have a universal language, and many of the universal effective values of colors have their origin in the chromatic quality of the light which ordinarily illuminates real scenes. The many variants of sunlight, moonlight, lamplight, and firelight, are reproduceable with the new tints with surprising fidelity.

"When a single pervasive color is used on the screen the observer tends to relate it either directly to some light source or to the reflection from some large area of a single definite color which occupies a considerable part of the picture. These two effects comprise the chief realistic uses of these tints and are the easiest to employ. But these uses by no means exhaust the possibilities of the tints.

"Thus Verdante, a delicate green in the series, connotes by direct objective association young foliage, grass, gardens, vernal landscapes, and hence is particularly useful in the rendition of scenes containing

Universal Markets New Electric-Welded Reel

All-welded sound reels warranted to last for years are now being marketed by the Universal Electric Welding Co., 37th Ave. and 10th St., Long Island City, N. Y. A feature of these spot and point electric welded reels is the perfect protection they afford all film, the danger of scratching and scraping the celluloid having been reduced to a minimum in their design and construction.

Universal stresses these salient features of the reel—no brazing, no clamps, no screws and no paint. Even tension and rigidity are assured for Universal reels by special care taken in their manufacture, to which has been applied the knowledge gained by the company in reel manufacture for many years in addition to the special electric welding process which is the exclusive property of the Universal Co.

Wins Projectionists' Favor

This new Universal electric welded reel has met with an enthusiastic reception among projectionists throughout this country and Canada, who are familiar with the product of this company for many years past.

Universal facilities for precision manufacture and production are taken advantage of by many laboratories and picture producers who seek precision work for their experimental programs.

Rearranging Disc Material

Rearrangment of material on records is entirely practicable, and portions may be deleted, new portions added, or new sounds added to those already recorded; in fact any changes of this type may be made which can be made in the picture. Although the detailed technique of rearranging, or "dubbing" is not highly developed at present, its advancement appears to offer no serious technical difficulty. Hence the refinement reached will probably depend upon the rate at which improvement takes place, and the extent to which the method is used in the field of sound pictures.

Snyder to Internat. Photographer

Silas Edgar Snyder has resigned his post as editor of *American Cinematographer,* published in Hollywood, to accept the editorship of *The International Photographer,* official bulletin of Local No. 659, International Photographers. The first issue of the latter publication was the current May number.

Snyder compiled an enviable record while with the *Cinematographer,* taking hold of it when it was only a four-page magazine and building it up by the sheer excellence of its contents to a technical magazine known all over the world.

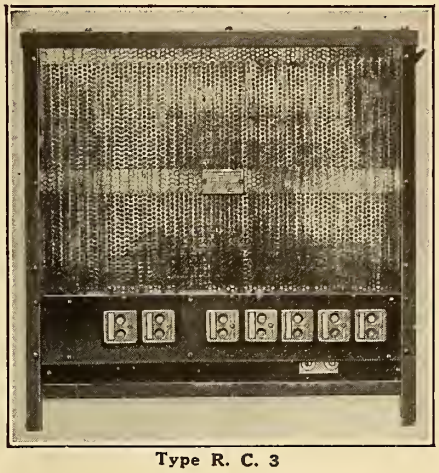
New Tinted Film

these elements. It may, however, be used effectively on scenes objectively very different, for the suggestion of youth. freshness, hope, aspiration, and those moods closely linked in our consciousness with the springtime of life."

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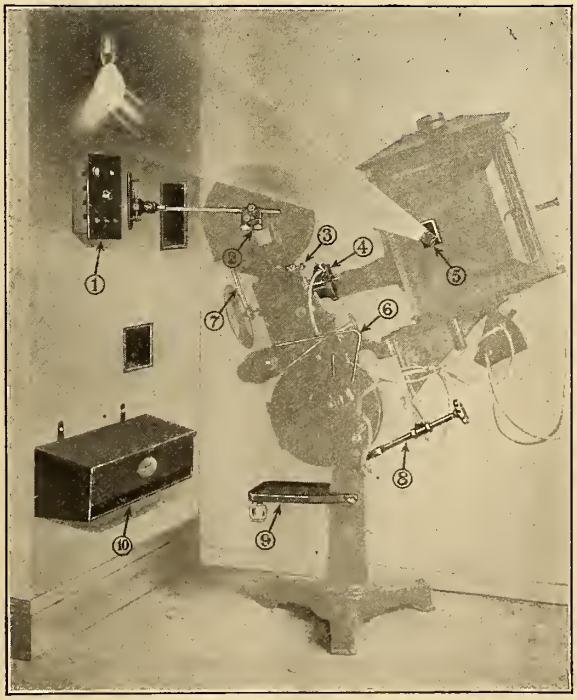
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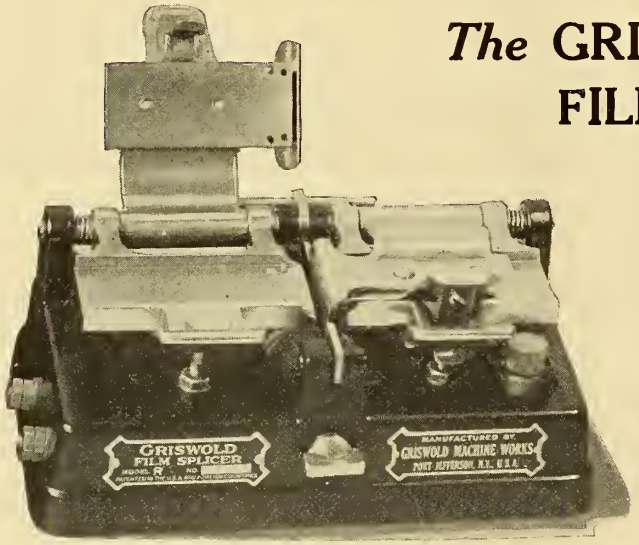
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Correspondence

THE following communication from an Indiana projectionist who wishes his name withheld, is indicative of the shortsighted policy pursued by many exhibitors in spending $1,000,000 for a theater into which goes a projection room which in these days would be nothing short of a disgrace to a small-town 500-seater. In the letter which is reprinted below is the real reason for the majority of poor projection results, notwithstanding the howls of several producers who insist that their production and exchange facilities leave nothing to be desired in the matter of good motion pictures. The letter follows:

"A communication from a brother in your April issue regarding the mutilation of film, which he ended by saying that the management should provide up-to-date equipment, got a laugh from me, not because the idea is inherently wrong but because of my personal experience.

Nothing for Equipment

"I am working in a new 3,000-seat house that cost $1,000,000 to build and equip. When the projection room was laid out, I thought it would be the real thing—No. 347 in that famous 'last word' series. The layout called for 3 projectors, 1 effect machine, and 2 spots. I promptly put my name in for the job and got it. . . . and now I am trying to give it to someone else.

"The theatre in question is one of several owned by the same party. When the new theatre was ready for equipment he took 2 Powers projectors, which were about five years old, out of an old house; an old spot from another, a twenty-year old generator from another and a fifteen-year old generator from another, and put them in the new house. This, then, is economy!

"Ye Antique Shoppe"

"Well, when the place was ready to run we had the following equipment: two old projectors, one old spot, two old generators, and a Brenkert effect projector—not the new Brenograph but one of the oldstyle models. Changeovers are made by hand—naturally, for electric changeovers cost several dollars. The program is de luxe, and may somebody or other protect us from the boss' fury should anything go wrong.

Advisory Council Task

"By the way, the floor is of rough cement, not painted nor covered. My partner and I call the room 'Ye Antique Shoppe,' but 'junk' could easily be substituted for the word 'antique.'"

The foregoing is an excellent example of conditions which have been frequently discussed in these columns. It seems futile to repeat that writing about such conditions will never better them, but such is the case.

Here, obviously, is a task for the thriving Projection Advisory Council, an organization which might effectively tackle just such a problem, with a better than even chance for success.

N. E. District Meeting Held at Bridgeport

THE New England District meeting held in Bridgeport on April 28th was easily the most successful of the series. The gathering attracted more than 300 Local Union members, with every Local in the five states being well represented. International Alliance officers present were President William F. Canavan, General Secretary-Treasurer Richard J. Green, Assistant President Harry Dignam, and William D. Lang, Manager of the Claim Department. Fred Dempsey, First Vice-President, of Boston, was present also.

Bridgeport (Conn.) Local Union No. 277 was host to the delegates, and they arranged for a pleasing get-together at a banquet. President Canavan addressed the gathering, and in the course of his talk he stressed the rapid development of sound pictures as they affect the craft, and pointed out the increased responsibilities of the craft to the new development. He also pointed out the need for constant study by members of the craft so that they might keep abreast of all new developments within the industry and thus do justice to their work, to their Local Unions and to themselves.

List of Delegates Present

Following is a list of Local Union delegates present at the meeting.

Massachusetts: James O'Brien, Boston; D. A. Haggerty and M. J. Casey, Springfield; Wm. A. Dillon, Fall River; Wm. C. Scanlon, Lynn; Wm. A. Guinan, North Adams; George G. Green, Fitchburg; A. Lamarsh, Holyoke; J. E. Hauesser and G. T. Rock, Worcester; M. Fitzgerald. Lawrence; J. Brennan, New Bedford; A. Butler, Brockton; J. F. Burke and T. Barrows, Boston; J. F. Gatelee and J. L. Lambert, Springfield; B. H. Chatel and Leo F. Barber, Salem; J. B. O'Neil, Northampton; J. Bell, Lawrence; C. Williams, Pittsfield; J. M. Cuniff, New Bedford; F. Penwell and F. Taylor, Haverhill; J. Salvo, Fall River; G. L. Henault, Brockton; G. H. Bissell, Pittsfield; G. A. Swanson, Attleboro; P. J. Doheny, Waltham; S. Lebon, Lowell, and G. Bignell, Taunton.

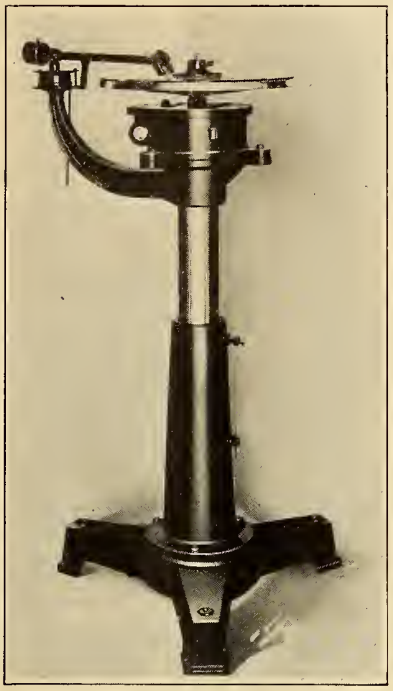
Connecticut: R. K. Lewis, D. W. Lapenta, and H. T. North, Hartford; J. M. Fitzgerald, J. Clealand and J. Corrigan, Waterbury; J. Fensore and W. Schesky, Bridgeport; M. Moriarity, New Haven; G. H. Doerner, New Britain; T. J. Shea, Meriden; A. P. Ellis, Torrington; H. E. Turner, New London; L. De Mott, Stamford; J. Moran, Willimantic; C. L. Crowley, Norwich, and R. Hazzard, Danbury.

Rhode Island: F. W. Newcomb, A. N. Dekker, E. W. Anthony, and H. F. Slater, Providence, and W. F. Dever, Woonsocket.

Maine: H. W. Boynton and T. Foley, Portland.

New Hampshire: M. R. Watts, Manchester.

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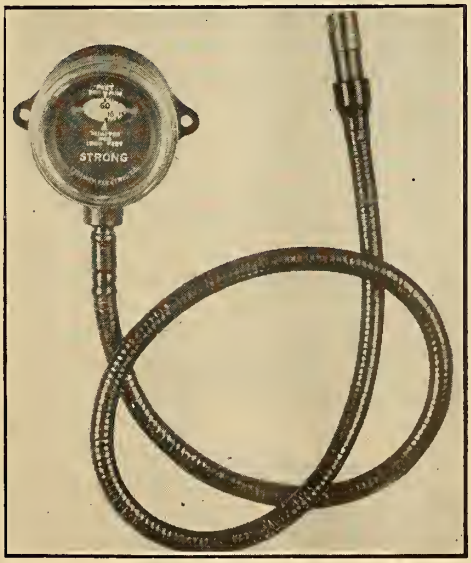
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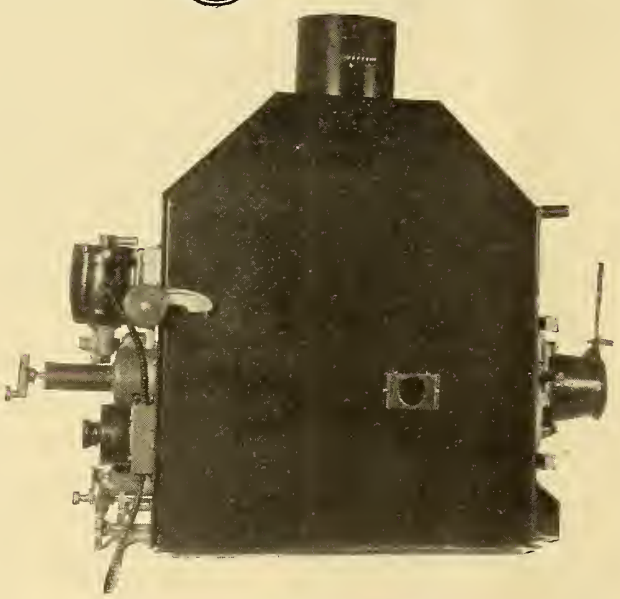
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Fiftieth Anniversary of Edison Lamp Invention

ON February 11, in 1847, at Milan, Ohio, Thomas A. Edison was born. On February 11, 1929, at Miami, Florida, this same Thomas A. Edison celebrated his eighty-second birthday, and a world paid its respects. This was only the start of a fitting celebration. On October 21, 1879, just half a century ago, he invented the first practical incandescent lamp. The light we know today was born. Already in some quarters the quavering flame that has served man since he emerged from his cave is known only as a curious relic of other days. And this year, light, the light we know, enters upon its golden jubilee. The golden wedding of an envisioned dream with stolid fact will be celebrated. For fifty years now these two have gone hand in hand and the world is immeasurably enriched by their union.

To enumerate the principal accomplishments of this wonderful life would be to catalog much that every schoolboy knows. To appreciate their full significance challenges even the most adaptive imagination.

A Marvelous Career

He has trapped and preserved for us beautiful sense impressions. He has banished night. He has spanned by means of thread-like, yet powerful, bridges, taut and quivering between their airy supports and humming through the frosty night, the space that separates the rushing waterfall from the homekeeper who needs its power. In a thousand ingenious ways he touches our lives at every turn.

Would you be reminded of your personal indebtedness to Edison? Then take thought of every commonplace thing you do today in a way that is better and more efficient than the way in which your grandfathers did it. Trace back to its origin the modern way of doing it. And you reconstruct the road down which we have traveled—sometimes all too careless about preserving bridges behind us—and then travel over this reconstructed highway, sooner or later you will find yourself in the vicinity of Menlo Park or even a boyhood laboratory in Northern Ohio. What is commonplace today was little short of miraculous fifty years ago. It remained for a genius too big to slip into conventional grooves to bring such things about.

Anniversary in October

No more fitting time could be chosen to honor Edison than that period lying between the date just passed, marking his eighty-second birthday, and October 21st, marking the fiftieth anniversary of the invention of his lamp. Every man, woman and child should have a part in it.

But, above all, that industry which has become a colossal giant of service sprung from the hand and brain of this single man, will want to take a principal part in it. It is the golden jubilee of light. It is also the golden jubilee of the industry of which we are a part. Light is its appropriate agency of expression. Let the golden shafts of Light the Militant be directed triumphant against the crowding forces of darkness. Let the gentle aura of Light the Beautiful crown the temples

New Eastman Research Lab. Opens in Hollywood

ON Wednesday, April 24th, the doors to the new technical research laboratory of the Eastman Kodak Company, at 6706 Santa Monica Boulevard, Hollywood, were thrown open.

And with the opening of this laboratory a long felt want on the part of the cinematographers and technicians of the film capital was filled. For the past ten years executives in the picture industry have realized this need, and rejoicing was general throughout Hollywood when the word was passed that the building had been opened.

The new laboratory, to be operated by the West Coast technical service staff of the Eastman organization, is a thing of extreme architectural beauty as well as a laboratory equipped with every known latest contrivance for the furtherance of the film industry's technical department. It is of reenforced steel and concrete and is 118 feet deep and 35 feet wide and 35 feet high.

Small Theatre Included

The interior is finished in gumwood, with walls a soft gray and with exquisite window hangings that blend. The large foyer is furnished with tastefully selected divans and chairs of overstuffed red leather. There are three offices on the second floor, also a library and conference room.

One of the big features of the building is a theatre equipped for both disc and film sound picture projection. The throw from projector to screen is approximately 60 feet; the ceiling is 25 feet and the width of the auditorium is twenty-five feet.

Complete Research Facilities

The theatre is equipped with the very latest in the way of projectors and sound equipment and can well be described as the last word in little theatres. Thirty-five of the latest pattern theatre chairs, wicker with deep cushions, have been placed in the theatre; and each row is placed slightly higher than the one in front, making vision an easy matter for all. There is room for extra chairs, making the theatre capacity fifty.

A research laboratory containing approximately $35,000 worth of modern equipment is another big feature for the cameramen. No expense has been spared in fitting this laboratory with the very latest in laboratory equipment. This laboratory will be open to the cinematographers and technicians of the various studios at any and all times.

---

of industry and commerce that man's ingenuity has reared. Let the spirit of Light the Benign and Helpful enter alike into mansion and hovel, into magnificent cathedral and lowly mission, into the humble wayside forge and into the steaming, clanking enclosures where leviathans of steel place at man's fingertip a thousand horses impatient to respond to his wish. Let it enter there and wherever man walks, worships, or works, unfolding to all the wonder of its magic.—DR. EATON in *Light*.

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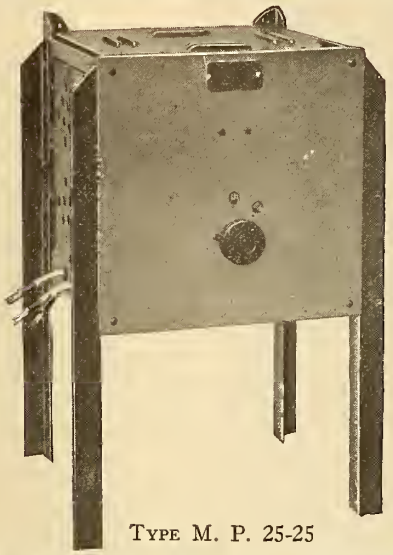
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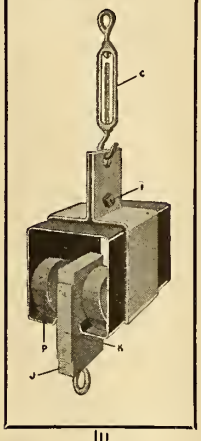
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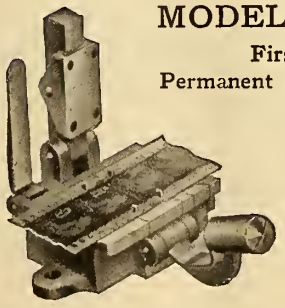
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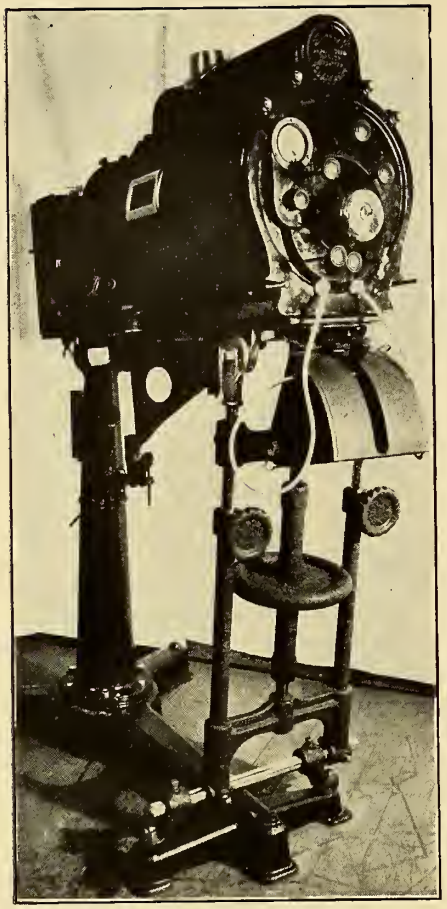
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Some Recent Advances

(*Continued from page 8*)

records with the best electric pick-ups now available. The response is sufficiently good to serve as a most valuable criterion in judging the quality of a record immediately after recording. At the same time a record may be played a number of times without great injury. At low frequencies there is little change; and at the higher frequencies a loss of about 2TU per playing. The opportunity thus made available for an artist to hear and criticize the results of his efforts, immediately at the end of his performance, can hardly be overestimated in its value to studio and recording operation.

Surface Treatment

After a groove has been cut into the wax record, the usual procedure is to render the surface conducting by brushing into it an extremely fine conducting powder. It is then electroplated. The technique in this step varies somewhat among the various companies producing records, although fundamentally the process is the same with all. The electroplate thus made, a negative of the original wax is called a "master." From it two test pressings are usually made using a molding compound such as shellac containing a finely ground filler. If they are satisfactory the master is then electroplated after being treated to permit easy removal of the positive plate.

From the positive, commonly called an "original," there is plated a second negative—a metal mold, commonly called a "stamper." From it duplicate "originals" may be plated, and from them duplicate "stampers." These successive plating processes involve no measurable injury to the quality of the record, and are comparatively simple and extremely safe in practice. By the custom of making a number of duplicates the master is protected from accidents to which it would be subject were it used directly for making finished records. The stampers instead are used to mold the final product, or "pressing"; it is not unusual to make a thousand pressings from a single stamper.

Test pressings are commonly obtained from the wax in twelve hours, and recent refinements have so reduced the time for the various processes that finished pressings may now, when necessary, be obtained within three hours after delivery of the wax. The pressing copies the wax record with such a high degree of accuracy that if frequency characteristics alone be considered, it shows almost complete perfection. Moreover it is cheap and durable, and as with an ordinary phonograph allows reproduction of sounds without careful adjustments or complex apparatus.

The "Pressing" Process

Various materials have been used in making the pressings. In some cases the material has been homogeneous, and in others the surface and the body of the record have been of different materials. Some records have been of laminated structure. There has not, however, been much latitude allowed the experimenter in his selection of materials. The records must be quite hard, and to have a reasonable life, must contain enough abrasive to grind the needle quickly to a good fit. At the beginning of the run of a new needle the pressures are very high, on account of the small bearing surface. They decrease rapidly however, so that with an ordinary loud steel needle in a phonograph of the usual type the bearing surface is increased to such an extent after one minute's wear that the pressure is only about 50,000 pounds per square inch. The high pressures and the necessary abrasive characteristics have introduced irregularities which are responsible for most of the extraneous noise commonly known as "surface" or "needle scratch."

Recent developments in the material of the finished records, together with refinement in the plating processes, have reduced the surface noise of records in the Western Electric Company theatre equipment by 50 to 75% within the last two years. It is not necessary to reduce the level of surface noise to the zero-point, but merely to the threshold of audibility under the minimum auditorium noise. Moreover, the important point is not the absolute amplitude of the imperfections giving rise to surface noise but their relative magnitude with respect to that of the useful sound amplitudes. Thus an effective reduction in "surface" could be made by using larger records or reducing the playing time of present records, in either case increasing the spacing of the grooves and the amplitude with which they are cut. Conversely, any large reduction in surface noise made by an improvement in the record material would make it possible to increase the playing time for records of a given size. There

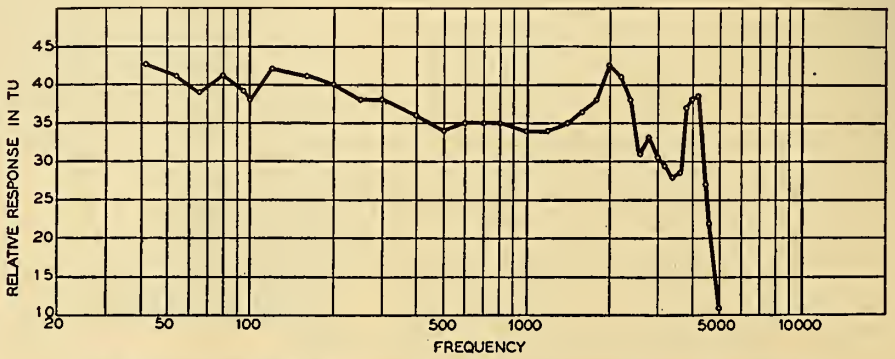


Fig. 9—Response of 2-A pickup driven by a constant-velocity pressing

In Wax Recording

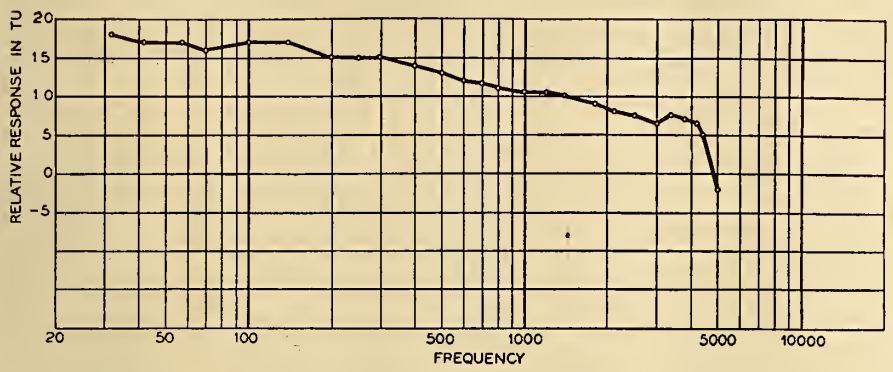


Fig. 10—Response of 4-A pickup driven by a constant-velocity pressing

is no known absolute or fundamental reason why further improvements in record materials may be expected, with corresponding reduction in surface noise. Furthermore, large advances in pick-up design offer distinctly new possibilities for reduction of "surface."

Recent Advances

Large advances have been made within the last two or three years in designing electrical reproducing structures. The mechanical impedance at the needle point has been reduced so that the point follows the undulations of the grooves truthfully without the necessity of somewhat destructive bearing pressures. At the same time the mechanical transmitting structure has been so designed that a very broad range of frequencies is conveyed properly from the needle point to the armature. Moreover, proper mechanical loads have been provided so that the vibrations are absorbed after they operate the armature; resonance as ordinarily considered has been eliminated.

The curves shown in Figures 9 to 11 show the improvement which has been made. The pickup shown in Figure 10 is free from the resonances shown in Figure 9. In the earlier pickup there were high needle point impedances in the region of these resonances, involving large driving forces destructive to both needle and record. Certain records were injured by only a few playings with this reproducer. The reproducer of Figure 10 is characterized not only by considerably reduced average needle-point impedance but, as shown on the curve, by a practical elimination of resonance. Hence there is an even greater reduction from the maximum impedances which occurred at resonance in reproducers of the earlier type.

Both needles and records have a longer life with the later type pick-up, which has been in commercial use for several months.

In addition, as is seen, the higher frequencies are reproduced in considerably better fashion. A third curve, Figure 11, was obtained with a more recent experimental model in which a lighter, though very much more rigid, structure is used to connect the needle point with the armature. In this model a further large reduction in needle point impedance has been effected, with corresponding reduction in wear on the records; in addition greatly improved reproduction has been secured at the high frequency end of the scale.

The developments and inquiries heretofore discussed, although in many cases undertaken for their application to sound pictures, are of direct application to phonograph reproduction for any purpose, irrespective of whether the sound is to be accompanied by a film. Application of the processes of the records which are to be synchronized with motion pictures has in addition involved meeting a number of conditions not previously encountered in the phonograph field.

One of the most important of these relates to editing, cutting and rearranging of a picture, with the attendant necessity of rearranging the speech or music. Various methods have been used to copy or "dub" a disc record by playing it and recording on a new wax the parts that are wanted.

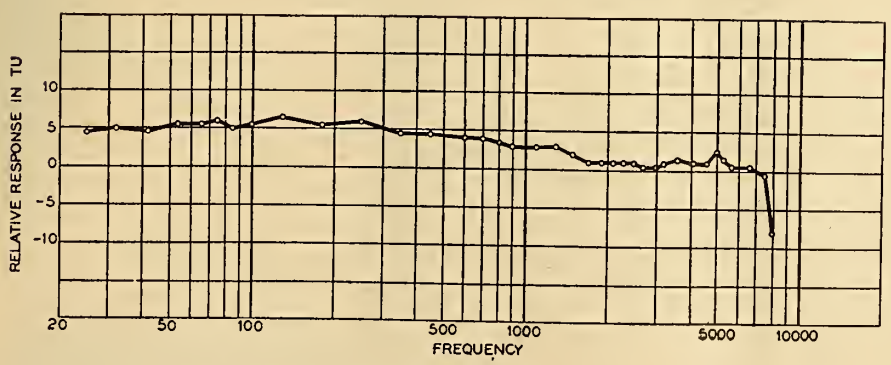
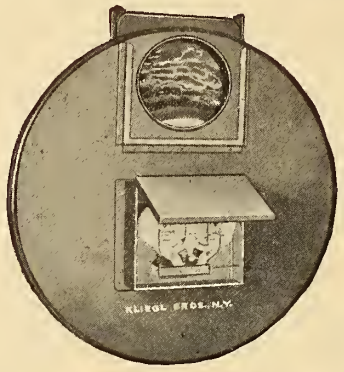


Fig. 11—Response of experimental pickup drive by a constant-velocity pressing

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The Vallen Sound Mask

DEVELOPING and marketing a new product is, in most instances, a real problem, the scope of which depends largely upon the intricacy of the device of apparatus directly concerned. While the apparatus itself may be very complete and may win great success, sometimes it happens that so much thought is given its development and preparation for the market that major problems naturally stand uppermost in the minds of its sponsors. The result is that what appeared to be but minor details often develop into problems of importance to the consumer.

Sound pictures have practically revolutionized the motion picture field. However, what appeared to be minor detail to the manufacturers of sound systems, where sound is embodied on the film, has proven an important factor as regards presentation. This problem is the proper handling of surplus screen surface, another responsibility for the projectionists, to whom everyone looks for flawless, effective presentation.

On the spur of the moment many makeshift methods of masking were installed. Their failure is the reason for the creation of the Vallen Automatic Mask for screen surface reduction—a device of great interest and assistance to the alert projectionist, to whom everything which will in any way better the presentation of sound is of vital importance.

This Mask is a mechanical device built to fill the specifications of the screen for which it is intended, accomplishing any reduction required. It consists of an upright piece of 1½ inches seamless steel tubing, extending from stage floor to top of screen frame, being anchored to screen frame by adjustable brackets. To this tubing are attached folding arms made from cold rolled steel. The object of the folding arms is to permit their folding back out of the way when not in use, minimizing the amount of space required for this accomplishment.

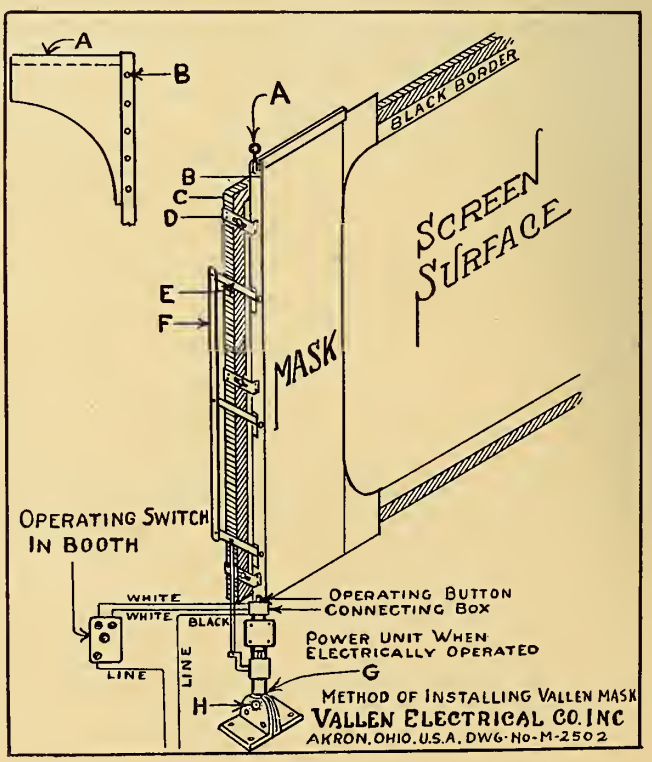
The cloth used for the masking curtain is a good quality black velour, a fabric which absorbs light well. In instances where the black border around the screen incorporates curves at each corner, these curves—also made of black velour—are furnished as a part of the mask and fold out of sight when not in use.

While the Vallen Automatic Mask can be manually operated, the majority of installations to date are for electrical operation. The power unit consists of a vertical motor, running a reduction unit, electrically controlled by a limit switch. The motor itself is not reversible, but runs in one direction at all times. The power and electrical units are very simple; there are no intricate parts and the electrical control system is neither a magnetic nor solenoid method.

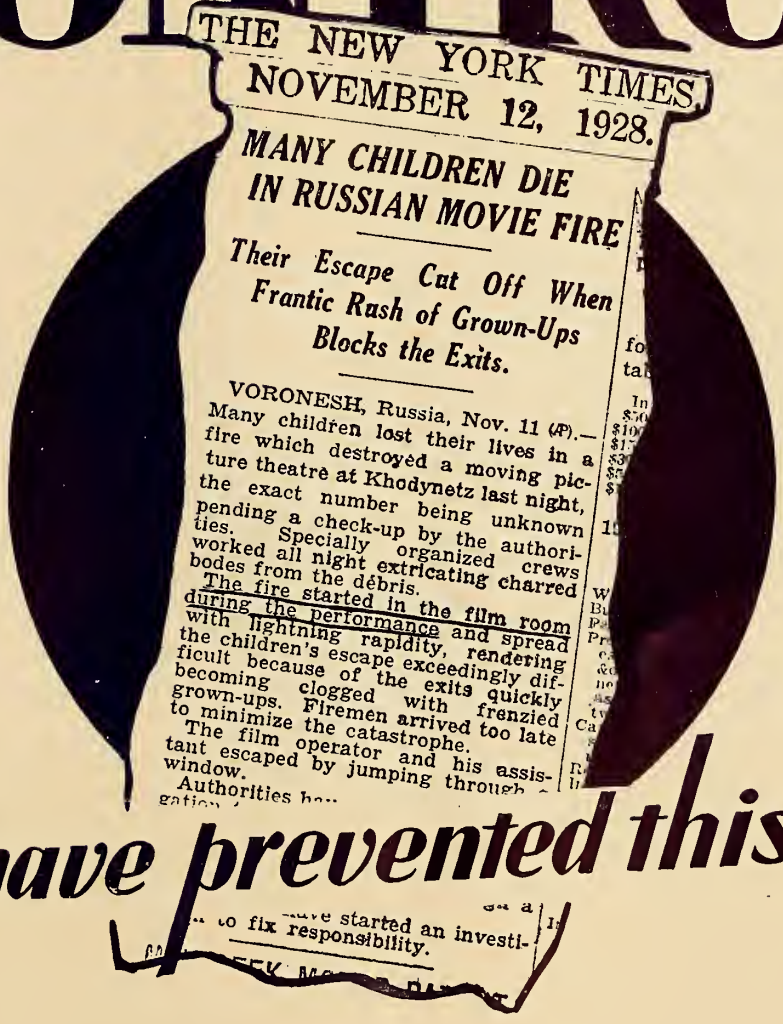
The time required to either open or close mask is approximately three seconds. Pressing one button in the projection room will open or close mask, as the case may be.

While this device is something new on the market, it is the result of several months' work and is past the experimental stage and fully guaranteed. Anyone interested in specific details or additional information may obtain same by writing E. J. Vallen, Vallen Electrical Company, Inc., Akron, Ohio, U. S. A.

A. (in center)—Ring to fasten cable when screen flies. B—Tubing, upright standard of Mask. C—Screen frame. D—Adjustable brackets to anchor Mask to frame. E—Lever attached to folding arm of Mask. F—Operating rod; pulling down folds Mask off; pushing up closes Mask on screen. G—Hinge joint to align Mask to tilt of frame. H—To tilt Mask, after foot has been fastened to floor, loosen this nut until desired angle is obtained; then *tighten securely*. In upper left-hand corner the symbols are: A—Arm supporting curve, and B, screws which hold curve to Mask frame.



SENTRY SAFETY CONTROL



THE NEW YORK TIMES
NOVEMBER 12, 1928.

MANY CHILDREN DIE IN RUSSIAN MOVIE FIRE

Their Escape Cut Off When Frantic Rush of Grown-Ups Blocks the Exits.

VORONESH, Russia, Nov. 11 (AP).— Many children lost their lives in a fire which destroyed a moving picture theatre at Khodynetz last night, the exact number being unknown pending a check-up by the authorities. Specially organized crews worked all night extricating charred bodes from the débris.

The fire started in the film room during the performance and spread with lightning rapidity, rendering the children's escape exceedingly difficult because of the exits quickly becoming clogged with frenzied grown-ups. Firemen arrived too late to minimize the catastrophe.

The film operator and his assistant escaped by jumping through a window.

Authorities have started an investigation to fix responsibility.

would have prevented this tragedy

SENTRY SAFETY CONTROL CORPORATION

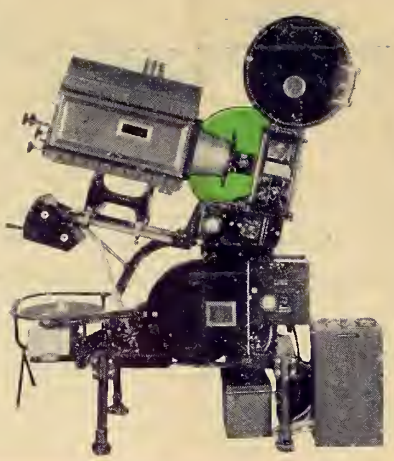
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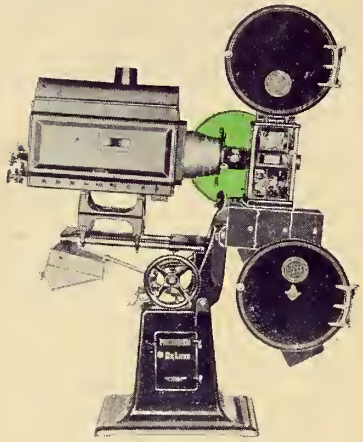
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The positive fire preventer. Can be attached to any projector. Costs only a few cents a day.

Motiograph De Luxe Model "H" equipped with Movietone - Vitaphone Sound Unit.



Motiograph De Luxe Model "H" equipped with Cinephone Sound Unit.



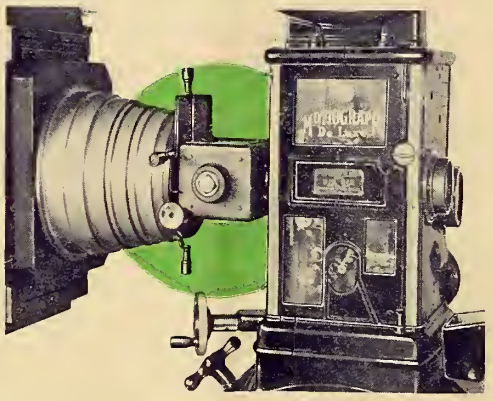
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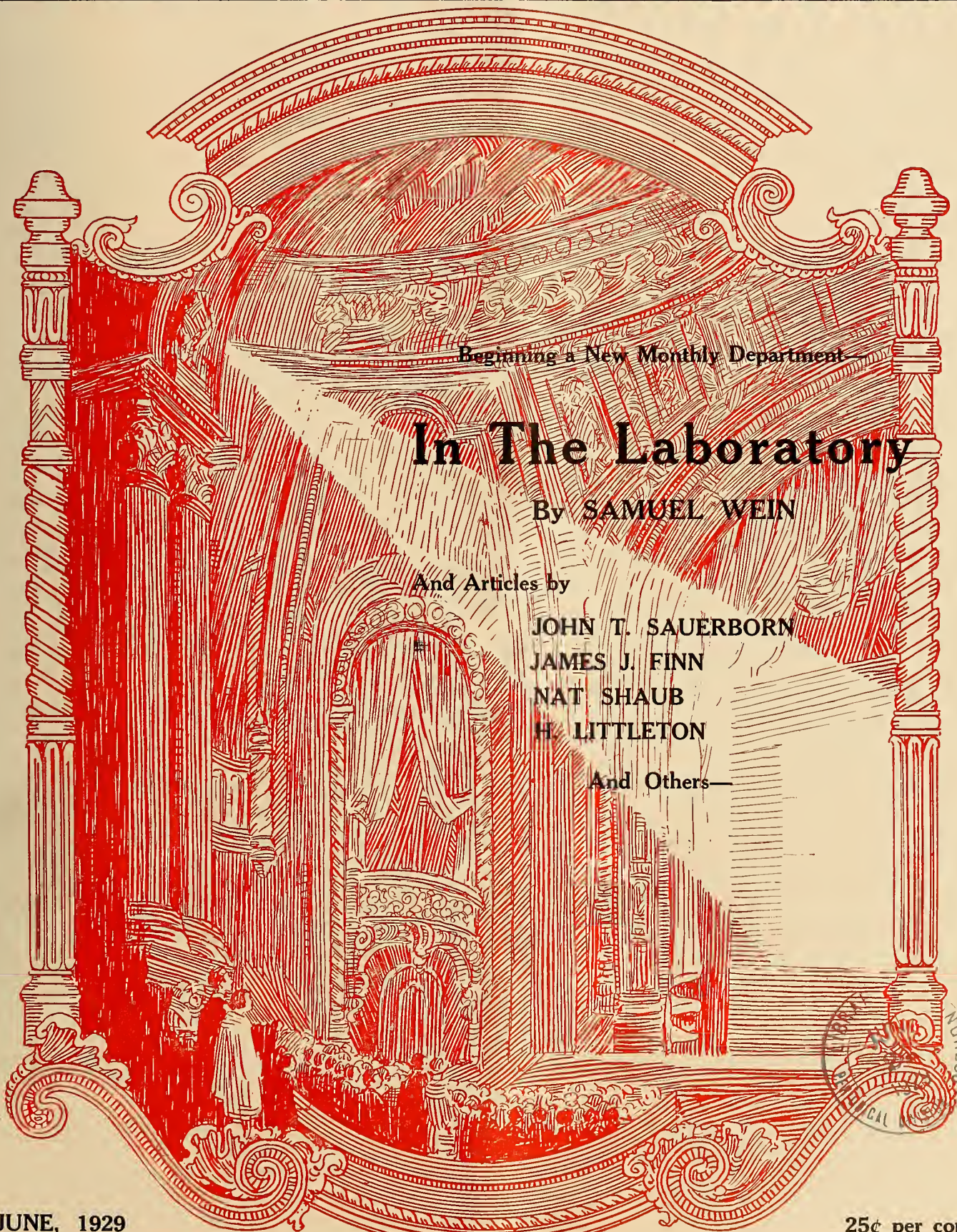


THOUSANDS ENDORSE THIS NEW MODEL 'H' MOTIOGRAPH DE LUXE WITH THE HEAT ELIMINATING FEATURE AND MORE LIGHT ON THE SCREEN

THE ENTERPRISE OPTICAL MFG. CO.
564 W. RANDOLPH STREET, CHICAGO, ILL.

THE MOTION PICTURE

PROJECTIONIST



Beginning a New Monthly Department—

In The Laboratory

By SAMUEL WEIN

And Articles by

JOHN T. SAUERBORN
JAMES J. FINN
NAT SHAUB
H. LITTLETON

And Others—

LIBRARY OF CONGRESS
PHOTOGRAPHICAL

JUNE, 1929
Vol. 2 No. 9

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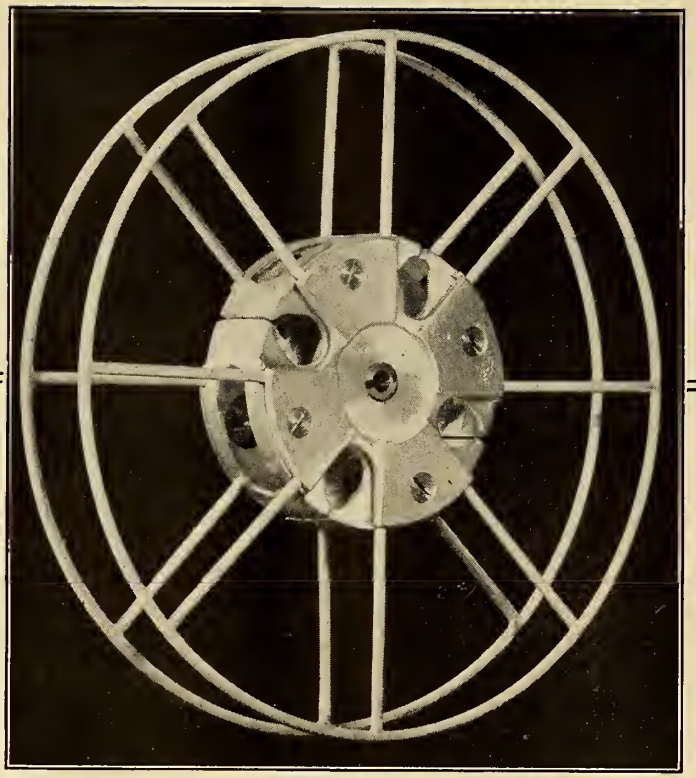
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Suitable for

Vitaphone—Movietone

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Manufactured and Distributed by the Sam Kaplan Manufacturing and Supply Co., Inc.

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1st—Broken parts replaced by sections—all you need is a screw driver and a few seconds of time.

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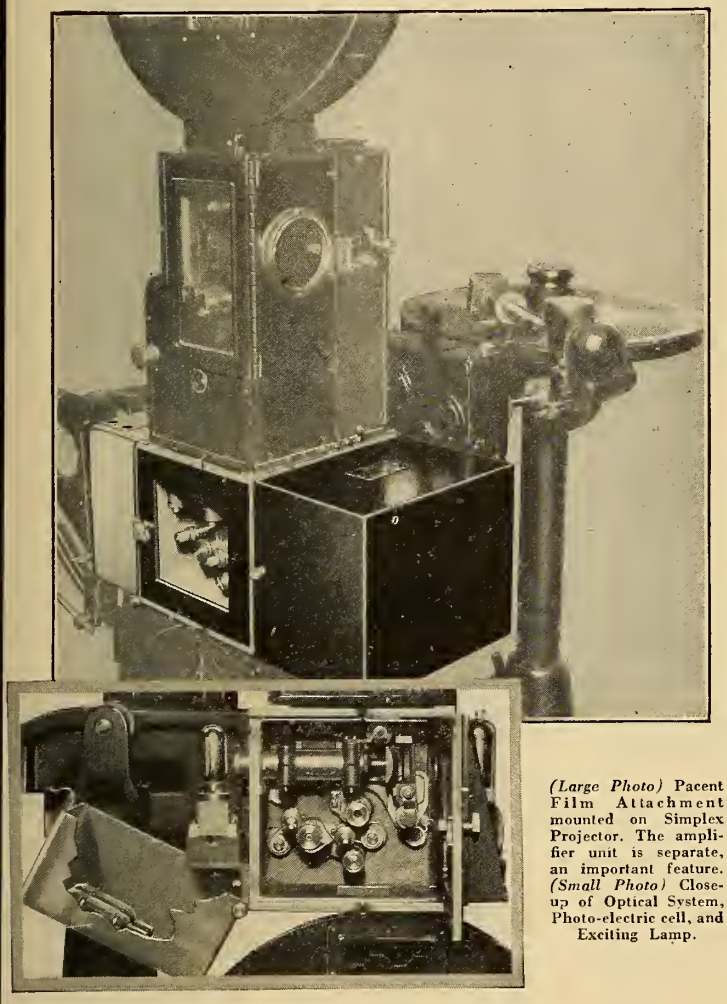
Now Being Used by Thousands of Theatres and Recommended by Expert Projectionists Everywhere

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PACENT PROMISED IT

PACENT Delivers it



(Large Photo) Pacent Film Attachment mounted on Simplex Projector. The amplifier unit is separate, an important feature. *(Small Photo)* Close-up of Optical System, Photo-electric cell, and Exciting Lamp.

The Pacent Film Attachment is unquestionably the simplest and most efficient device of its type. There are very few moving parts. When disc reproduction is used, the film is threaded directly from the projector head, past the Sound-on-Film sprockets *not through them.* Special periscope feature gives quick check on focus and operation of Sound-on-Film system.

The Finest Sound on Film Device Ever Built

PACENT brings perfected Sound-on-Film Reproduction into the hands of the exhibitor. Every exhibitor who buys Pacent equipment can now have Sound-on-Film that is literally years ahead in quality.

Pacent promised the finest Sound-on-Film device ever built. Pacent delivers it in the form of an attachment which sets new standards in simplicity, in operating efficiency, and in general performance.

Pacent contributes in the new Film Attachment many noteworthy advances. Look carefully at the two photographs in this advertisement. Read the descriptive text accompanying them. It is evident that the Pacent Film Attachment has features and advantages found in no other system for reproduction by the Sound-on-Film method.

Extreme simplicity, with fewer moving parts—the finest filtering system ever devised—a special optical and photo-electric cell system giving unequalled results—easy threading, eliminating necessity of threading through Sound-on-Film section when disc reproduction is used: These are but a few of the features of the Pacent Film Attachment.

The price is unbelievably low—$500 per attachment. Two attachments required with each Pacent Reproducer System.

Over 400 orders already in. These receive preference. If you have not placed your order, do so at once to insure early delivery.

PACENT REPRODUCER CORP.

Film Center Bldg. PACENT REPRODUCER SOUND SYSTEMS New York

Sales and Service Representatives in Principal Film Centers Throughout the United States and Canada

SIMPLEX PROJECTORS ARE DEPENDABLE

"The Show Must Go On"

THREE HUNDRED AND SIXTY-FIVE DAYS AND NIGHTS OF THE YEAR

RELIABILITY PLUS IMPROVEMENT BASED UPON A THOROUGH UNDERSTANDING OF THE SPECIAL REQUIREMENTS OF THE MOTION PICTURE INDUSTRY, ARE THE REASONS FOR

SIMPLEX SUPREMACY

INTERNATIONAL PROJECTOR CORPORATION
90 GOLD STREET NEW YORK

DeForest System Fitted for All Projectors

DeForest Phonofilm is now available without difficulty for installation in theatres which are using either Motiograph, Powers, Fulco, or Baird projectors. The work of making the various changes necessary to accomplish this end has been long and tedious, but DeForest engineers. in cooperation with the projector manufacturers, have met all requirements satisfactorily.

Allows Wider Choice

Heretofore, DeForest sound-on-film installation have been possible only where a Simplex was used, with a result that the field for this device was comparatively small. This was true of other sound devices also. But now any theatre may select its sound equipment without regard to the requirements of its projector design.

With the announcement of the availability of DeForest Phonofilm for all projectors, theatres are now afforded a much wider choice of sound picture equipment.

Commutators

Commutators should always be kept clean and well polished. Under normal operating conditions, a commutator will require only occasional cleaning with a piece of canvas or non-linting material. No vaseline or oil of any description should be used on a commutator. In case the commutator has become rough, this roughness may be removed by polishing with a piece of sandstone. from which a segmental piece has been cut, having the same radius as the commutator.

How to Polish

If sandstone is not easily obtained, sandpaper may be used by pressing it against the surface of the commutator with a block of wood shaped like the sandstone mentioned above. In both cases the commutator should be running at a high rate of speed during polishing, and the sandstone or sandpaper moved back and forth along the surface parallel to the shaft.

After this has been done, the commutator and brush faces should be carefully cleaned to remove any grit which might cut or scratch the commutator. Emery cloth should never be used on a commutator or brush.

Motiograph Now Available for All Sound Systems

The Enterprise Optical Mfg. Co., of Chicago, announces that the Motiograph projector is now adaptable for DeForest sound apparatus, either Phonofilm or Phonodisc. The Enterprise Co. stresses the importance of this announcement, since all Motiograph users may now figure in all of the leading sound devices when laying out their sound picture plans.

The Motiograph projector is now adaptable to the following sound systems: Western Electric systems (Vitaphone and Movietone); Cinephone film and disc systems, Dramaphone unit, DeForest Phonofilm and Phonodisc, and Moviephone.



Photo by Apeda, New York

BRING THEM BACK FOR MORE

WITH National Projector Carbons behind your films you can be sure of a good showing. Clear projection brings satisfaction. The modern soft, low key or fuzzy film, shot with trick angles or light-absorbing prisms, requires greater illumination to get the effect on the screen . . . that means stepping up the amperage. National Projector Carbons burn smoothly on increased amperage . . . produce greater light without spitting or pitting. This insures clear, flickerless pictures — pictures that please the audience and are easy to look at. With good films and good projection your theater will stay crowded. National Carbons help keep attendance growing.

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Genuine Optical Crown Glass Plates

SURFACES WITH PRECISION POLISH—WILL NOT DISTORT THE PICTURE

FISH-SCHURMAN CORPORATION

45 West 45th Street NEW YORK

for the projectionist:

Ease *and* Perfection of Operation!



This book will help you to understand De Forest equipment. Write for your copy.

THE SHOW must go on! If it stops, you, the projectionist, must take the blame. There were enough problems in the days before sound. Now these problems have increased manifold — but the show must go on nevertheless!

You owe it to your theatre, to your audience and to yourself to help select the very best in sound equipment—not only in tonal qualities—but also in ease and perfection of operation. That's where you come in.

For example, consider only one unit — the exciting lamp—in the De Forest equipment. If one should burn out, another is ready and in focus almost instantaneously.

And this is just one of the many De Forest features. De Forest, ever alert to the requisites for a perfect show, no less than to your working convenience, has provided this and many other superior features. With De Forest equipment *the show does go on!*

IT'S THE BEST SOUND IN TOWN

The Combination Standard $6,500.

Junior $4,975.

Liberal time payments. No Weekly Service Charge.

PHONOFILM Standard $5,000—Junior $3,995

De Forest

PHONODISC Standard $3,450—Junior $2,745

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GENERAL TALKING PICTURES CORPORATION
218 West 42nd Street - - New York City

Principles of a Projection Lens

By HUGO LITTLETON

Charting the passage of light rays through a projection lens presents an extremely interesting optical study. There exist many conflicting theories as to the nature of the optical laws relating to, and the functioning of, a projection lens, and not a few of these erroneous ideas have been given such frequent expression that they have come to be regarded as fact. The accompanying article by Hugo Littleton, a member of New York City Local 306, should prove most effective in checking the further spread of misinformation on the subject.

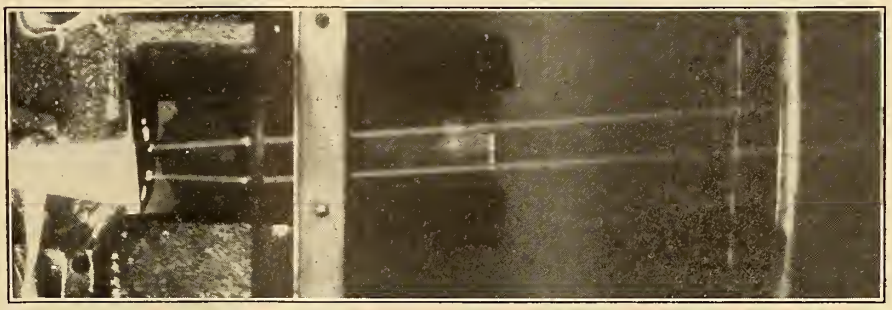


Fig. A. Showing passage of a center and a parallel ray through a bi-convex lens

DESIGNATING the lens the heart of a complete projection outfit is hardly overemphasizing the importance of its place in the realm of projection. Consideration may be given the importance of the mechanism, the lighting system employed, the quality of the film itself, etc., but in the last analysis one would have to admit that the work accomplished by these components is finally centered in and must pass through the projection lens, thus making the latter truly the heart of a projection apparatus.

From an operating standpoint, the projection lens requires relatively little attention as compared with the other parts of a projector. This probably is the reason for the general lack of knowledge concerning the nature of the projection lens and the laws by which it is governed. Not a few projectionists think that the rays from the aperture all center about halfway between the front and back combination and in consequence reverse the picture at this particular point. This conception of the functioning of the lens is absolutely incorrect.

We come much closer to the truth of the problem by imagining a cone of light emanating from a point on the aperture, and after passing through the lens the rays deviate from the initial direction so as to center at the screen. In this way we can conceive a picture of two cones both having as their basis the plane of the projection lens.

Path of Light Cones

The pinnacle of the cone coming from the aperture is naturally the point in the aperture; and the pinnacle of the cone in front of the lens is on the screen. If the vertex of the first cone lies above the optical axis, the vertex of the second cone lies below it. We can extend this picturization to every point of the aperture, but it would be quite difficult to conceive the light cones coming from several or all points of the aperture.

We have to limit ourselves not only to a single tiny point and the light rays coming from this point, but even further in order to attain a clear picture of the nature of the projection lens. This is only possible by reducing the number of rays under consideration to a minimum—that is, to two rays, this number being sufficient to establish the corresponding points of the aperture and of the screen.

We might ask ourselves this question: "What are the two rays which will satisfactorily explain the path of light rays through the lens?" One of these two rays passes through the center of the lens. Its path is rather easy to chart since it never changes its original direction and builds one straight line from start to finish. The reason for this somewhat preferred position lies in the fact that the surface of a lens where a center ray enters is parallel to the surface where the ray leaves the lens. In this particular instance the lens acts like a plate of glass. Figure 1 shows this clearly.

This single ray is sufficient to give the direction of light coming from a point on the aperture; and if the plane where the picture will be in focus is already established, the corresponding point on the screen to a point on the aperture is found where the center ray traverses the screen.

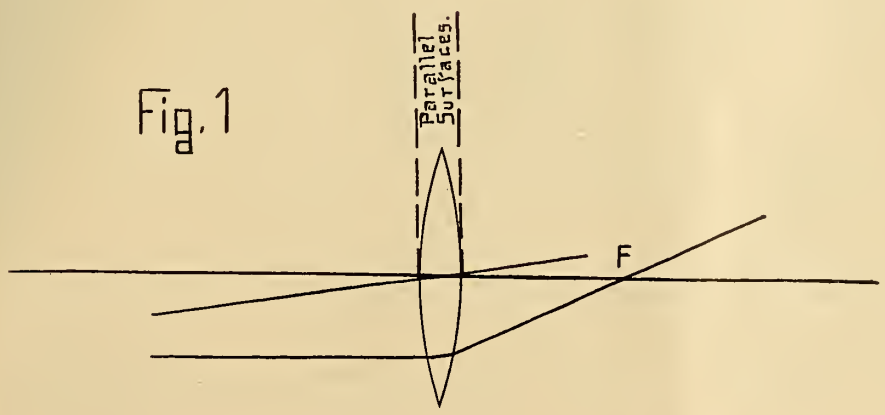
The second ray necessary to a clear picture of the working of the projection lens is a ray parallel to the optical axis. Following this ray through the lens, we see that it is bent in such a way as to meet the first constructed center ray right at the screen. In this manner we have not only established the direction of the light coming from a point on the aperture, but also the actual place at which it is in focus—that is, the plane of the screen.

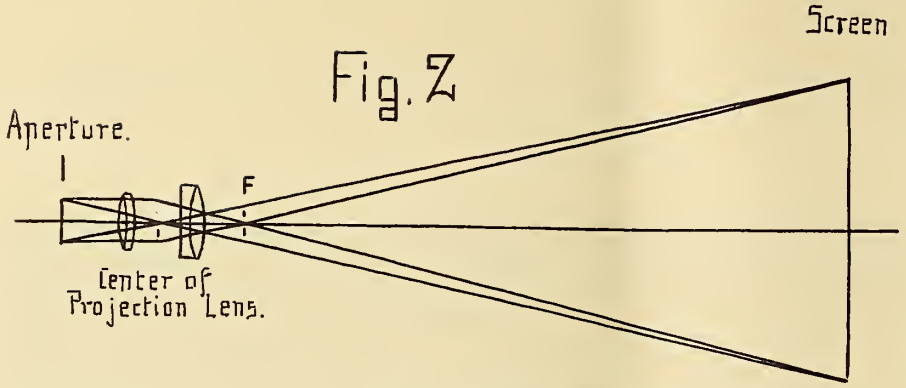
Where the Rays Meet

By taking an ordinary convex lens and holding it into the path of the sun's rays we are able to center the rays in one point where, because of this concentration, considerable heat is developed. This point is the focus of the lens, and the rays from the sun all center on it because the sun's rays are all parallel. Fig. 1 also shows a ray parallel to the optical axis, meeting the focus of the lens after passing through it.

For the reasons previously given, a ray coming from a point of the aperture and being parallel to the optical axis is bent in the direction of the focus after passing through the lens. Extending its length still further, this ray will finally cross the center ray first determined exactly at the screen. All the remaining rays coming from a particular point on the aperture which we have not considered heretofore, will also center at the same point on the screen. It is then unnecessary to chart their special paths through the projection lens.

Finding the path of the two rays coming





from any point on the aperture enables us to determine the plane of the screen as well as the place on the screen of a particular point on the aperture.

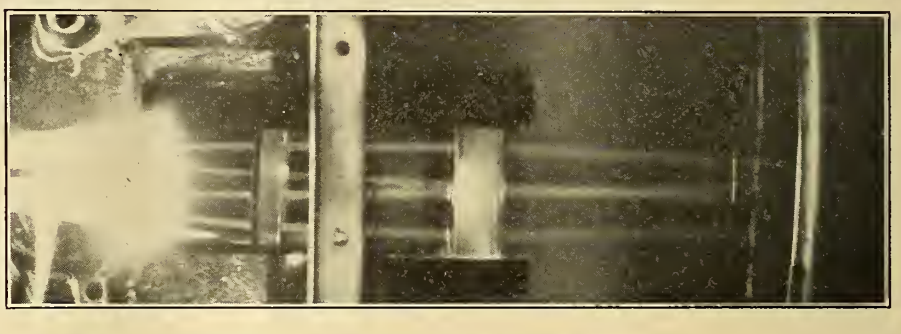
Photographing the Rays

Figure 2 is a diagram of the path taken by the light from a point above and a point below the optical axis. The diagram is self-explanatory and gives us a satisfactory approach to the problem of the nature and functioning of the projection lens.

The photographs shown are visible proof of the foregoing. They were taken, as is evident, with the aid of a specially constructed lens-holder which had been cut open on the observer's side. By blowing smoke into the path of light the rays were made visible. A mask was placed in the aperture gate and at the beginning of the lens tube. By having pinholes in both masks it was possible to single out particular rays from the infinite number ordinarily passing through the lens.

Figure A (photograph), shows a center and a parallel ray passing through a biconvex lens; while Figure B pictures four rays: two coming from a point above the optical axis and two coming from a point below it. The similarity of this photograph with Figure 2 may be easily discerned.

(Below) Fig. B. Showing passage of 4 rays: two from a point above, and two from a point below, the optical axis.



Questions on W. E. Apparatus

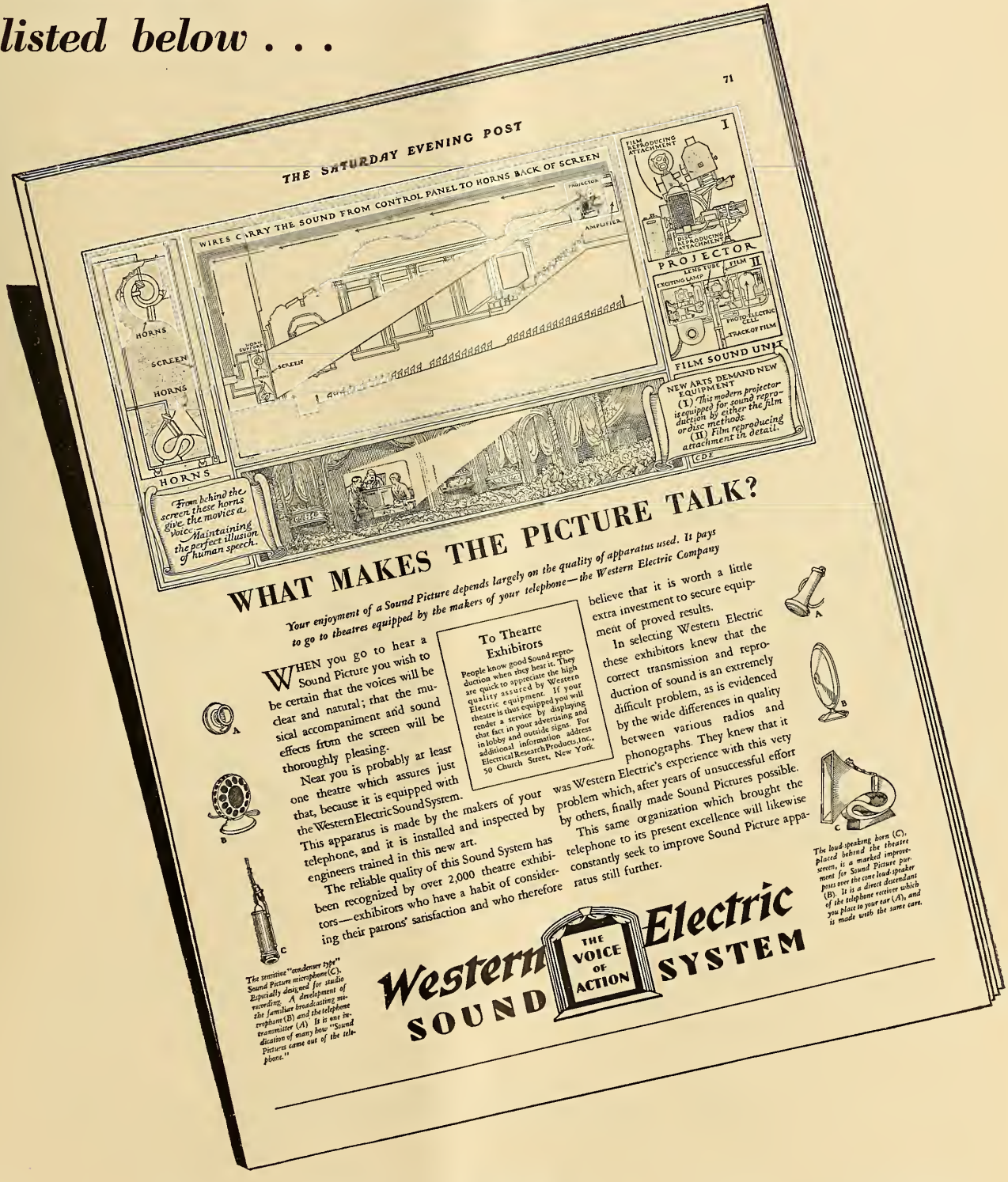
THE following questions on the operation and maintenance of sound picture apparatus were compiled directly from material which has appeared in these columns within the past year and a half, and are intended to provide a check on how well we have absorbed the knowledge contained in the various writings on the subject. The questions presented refer only to Western Electric apparatus, but the operating phases covered are applicable to all makes of sound equipment.

The answers to all these questions appear elsewhere in this issue, and may be identified by a number corresponding to that of the question.

1. What is the purpose of sound projection equipment?
2. What recording methods are used
3. What is the first step in synchronous reproduction?
4. How is the electric current obtained with the disc method?
5. Describe the disc method.
6. At what speed does the disc revolve?
7. How long does the disc run?
8. Does the film differ from ordinary film in any way (for disc)?
9. How is the current obtained with the film method?
10. Where is the reproducing attachment located with the film method?
11. Describe the film used in the film method.
12. How is the small electric current from the reproducer or the photo-electric-cell amplified?
13. How is this current converted into sound?
14. What type of screen is most adaptable to sound?
15. How is synchronism obtained in the disc method?
16. How is synchronism obtained in the film method?
17. At what speed should synchronized film be run?
18. How is this speed maintained?
19. How many sets of batteries are used for synchronized pictures?
20. What are these batteries called?
21. What is the function of the "H" batteries?
22. What is the function of the F^1 and F^2 batteries?
23. How are the F^1 and F^2 batteries used?
24. How long should each set of batteries run before charging?
25. How can you determine when a set of batteries should be charged?
26. What does the hydrometer show?
27. How often should the condition of the batteries be tested with a hydrometer?
28. How is this test made?
29. Where should gravity readings be entered?
30. When should batteries be charged?
31. When should they be taken off charge?
32. How is charging rate adjusted?
33. Should pilot cell be changed?
34. How often should pilot cell be changed?
35. State your reasons for changing cell.
36. How do you prepare for operation of the battery panel? State the order of procedure for same.
37. How do you take the battery panel out of operation?
38. What kind of water is used in batteries?
39. Should acid ever be added to cells?
40. How often must the water level be examined?
41. How much water should there be in cells of batteries?
42. How should water be put in cells?
43. Where may water be purchased?
44. How often should battery tops be cleaned to prevent short circuits and noises in operation of equipment?
45. How should battery tops be cleaned?
46. Should filling caps ever be removed?
47. How should batteries be treated when not in use?
48. How should battery room be kept?
49. How many people should have charge of storage batteries?
50. How should film pick-up apparatus be prepared for operating?
51. What will cause poor quality of light from the exciting lamp?
52. State first step in starting film amplifier equipment.
53. State second step.
54. State third step.
55. State fourth step.
56. When should exciting lamp be replaced?

(Answers to foregoing questions appear on page 38.)

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Publication	*Date*	*Circulation*
American Boy	September, 1929	279,059
College Humor	September, 1929	239,276
Motion Picture Magazine	September, 1929	338,973
New Yorker	August 3, 1929	69,472
Photoplay	September, 1929	547,605
Popular Science Mo.	August, 1929	324,938
Saturday Evening Post	July 13, 1929	2,902,093
Scientific American	August, 1929	93,660
Time Magazine	August 12, 1929	180,465
	Total Circulation	4,975,541

Principles of D. C. Machines

By NAT SHAUB

LET us analyze a D. C. machine and see just what is what—and why. For our purpose the simpler the machine the better, because in principle all of them are the same. The Grammè machine is about the simplest that comes to mind at present, and it is particularly adaptable to this work because the currents through it may readily be traced and the interaction of its magnetic fields noted. The machine which we will consider as a motor consists principally of two parts: (1) the armature, and (2) the field magnet.

The armature consists of an iron ring around which a closed coil is wound, and which is insulated from the ring proper. The field magnet is of the horseshoe type. On the bar joining the two halves of the core is wound the field coil, the ends of which are connected to some source of current, thus making it an electro-magnet. The armature is supported between the pole faces of the electro-magnet.

Current is supplied to the armature by means of brushes which make contact with the wire on the armature. The brushes are arranged in a brushholder which may be shifted, thus altering the relation of the brushes to the pole pieces of the electro-magnet. The torque in the machine is due to the interaction of the magnetic field of the electro-magnet and the fields set up by the current flowing through the armature.

The resultant effect of the two fields may be shown as follows: Assuming fields as indicated in Figure 1, the lines of force are more crowded on the upper side of the conductor, due to the combination of the two fields. Below the conductor the lines of force are in opposition, thereby creating a weaker field. The tendency of the magnetic lines of force is to straighten out and by their so doing the conductor will be forced down. If the current is reversed through the conductor the reverse action will take place.

The polarity of the electro-magnet as shown in Figure 2 has been found by applying the right-hand thumb-rule for a coil. Although this rule may be found in any elementary textbook on electricity, it might be well to give it here. It is: "When the right hand is placed over the coil, with the fingers pointing in the direction of the current, the thumb will point to the North Pole magnet."

When a current is sent through the armature, each armature turn becomes a magnet and has a field around it which is determinable by the R. H. rule. Referring to Figure 2, the magnetic field from A to a to the left of the axis of the brushholders (i.e., a, b, c, d, and A), is in the same direction as the field due to the electro-magnet, and will therefore be strengthened.

To the right of the axis of the brushholder the fields are in opposition, therefore the resulting field is weakened. The result is—rotation as indicated.

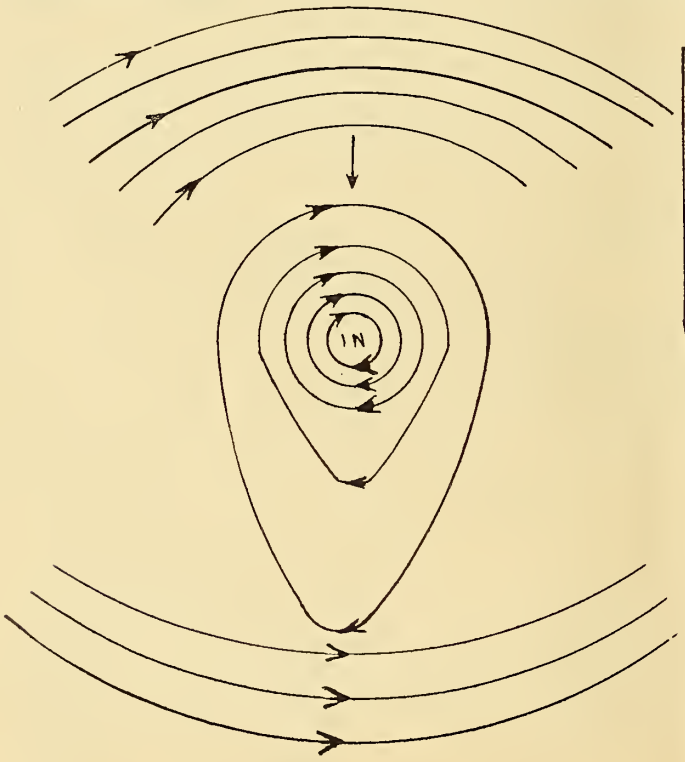
It might be well to go into this phase of the subject a bit more specifically. As stated above, each armature turn has a field around it. The force upon each turn when placed in a magnetic field will be that given by another elementary rule—namely, Fleming's Left Hand rule.

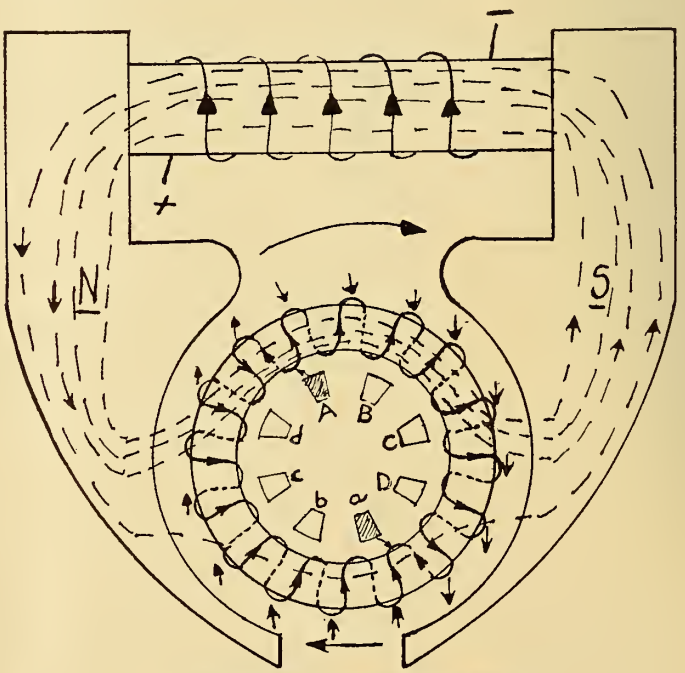
Mr. Fleming formulated the following rule: When the forefinger of the *left hand* points in the direction of the flux (magnetic lines of force), with the middle finger pointing in the direction of the current flow, the thumb will point in the direction of the force (indicated by arrows at each turn of armature in Fig. 2). And, if the force is downward to the *right* of the armature axis, and upward to the *left* of the axis—just what is the result? Just this:

The current entering the armature at A divides and reunites again at a. As a result of this current the armature, as stated previously, becomes an electro-magnet having its positive pole at A and its negative pole at a. The positive pole of the field magnet *repels* the positive pole of the armature; but—the positive pole of the field magnet *attracts* the negative pole of the armature. Likewise, the negative pole of the field magnet *repels* the negative pole of the armature, but *attracts* the positive pole of the armature.

The rotation of the armature will be constant so long as it receives current and so long as the relative positions of the polarities of the armature and the field remain the same. That is, so long as the positive poles of the armature coils are not directly opposite the negative pole of the field magnet, there will be rotation. This condition may be obtained, since the polarity of the armature at any point depends upon the position of the brushes.

In the more advanced type of machines a commutator is used. The purpose of the commutator is to send a current through the armature in such a way as to keep the North and South poles of the armature fueled when it is rotating.





(Left) Figure 1. (Right) Figure 2

IN THE BOOTH

"Film Daily" sums up the case of sound pictures and the projectionist when it says:

> "The destiny of sound pictures, insofar as the public is concerned, rests weightily in the lap of the man in the theatre booth. The projectionist can make or break the show and, therefore, his importance in the exhibition scheme of things should be realized."

RCA Photophone is keenly aware of the part that "the man in the booth" plays in screening sound pictures and has sought to facilitate his work with an equipment that is as nearly flexible as that of silent pictures.

The service department of RCA Photophone stands ready at all times to cooperate with the projectionist on any special problem, and in return, RCA Photophone invites the suggestions and cooperation of the projectionist to the end that the interests of all may be most satisfactorily served.

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Spoor-Berggren Wide Film System Shown by RCA

By JAMES J. FINN

An Appreciation

"It's a matter of great satisfaction to me to be able to express here in their own publication my appreciation of and thanks for the splendid work done by the projection staff of the RCA studio in New York in connection with my new process. Throughout both the preliminary work and the public demonstration the work of these men was superb, and their efforts contributed much to the success of the demonstration.

"The projectionist craft should be proud to number among its members such representative men as these."

JOHN J. BERGGREN.



John Pross



John J. Berggren



C. Kelner, Chief



R. M. Cohen

Inventor of new Spoor-Berggren wide-film process and RCA New York studio projection staff which assisted in preliminary work and handled first demonstration in faultless style. All three are members of Local Union 306, New York.

A NEW and revolutionary system of motion pictures, synchronized with sound by RCA Photophone, and projected on the world's largest motion picture screen in lifelike perspective, was demonstrated for the first time on May 24th to a private audience at the Gramercy Studios of RCA Photophone, Inc., in New York City. The new system, described as "natural vision" photography and projection, is the work of George K. Spoor and John J. Berggren of Chicago and represents over ten years' research and laboratory development, in the effort to overcome the present-day limitations of the screen. The new system projects pictures of characters and scenes with lifelike size, detail and perspective on a vast panoramic screen.

Synchronized with sound by RCA Photophone, the new development, it was forecast by engineers and motion picture experts, opens a new field of opportunity in motion picture production.

To show the startling contrast in size and perspective between the standard motion picture of today and the "natural vision" picture a standard 35 mm. film was first thrown on the screen in the size as normally viewed in theatres. It seemed like a postage stamp on the vast area of the new screen employed for the projection of the Spoor-Berggren film. The scene was from the first act of "Lady Fingers."

30 x 52 Picture

Immediately following this, the identical scene recorded and reproduced by RCA Photophone on the Spoor-Berggren film was flashed upon the great screen, 30 feet high and 52 feet long, sweeping across the immense studio proscenium from post to post, although pictures under the same system can be projected to a length of 70 feet. The line of a musical comedy chorus, dancing and singing in rhythm across a stage that extended the entire width of the studio, was caught in its entirety by the camera and projected upon the screen. With the vast screen reaching from the floor to the vaulted roof of the RCA Photophone studio, it seemed as if the whole musical comedy chorus were walking in among the audience of motion picture producers, engineers and newspaper men gathered to view the demonstration.

The application of the new system of natural vision pictures to great outdoor scenes and spectacles was next demonstrated, when a scenic film of Niagara Falls was thrown upon the immense screen. The audience found itself seated before one of Nature's wonders, with the majestic spectacle of water rushing from a great height down to their very feet. So perfect is the focus attained by the camera in the new system that details in the picture as far as five miles away from the camera lens, stood out as sharply as the figures in the immediate foreground. The Niagara Suspension Bridge was shown clearly outlined in the distance against the Falls, although the bridge was 2½ miles away from the camera when the scene was taken. A lighthouse tower in the background was photographed at a distance of five miles.

Retains Natural Shadings

By means of the Spoor-Berggren system the flat, shadowy, black and white

(*Continued on page* 30)

Features of RCA Spoor-Berggren Demonstration

1. Pictures produced under the Spoor-Berggren system and synchronized with speech and music by RCA Photophone, were projected upon a screen 30 feet high and 52 feet long, comprising 1560 square feet of glass encrusted surface.
2. Mammoth panoramic pictures more than 70 feet long can be thrown on even larger screens under this system.
3. The new camera, it was demonstrated, was able to photograph scenes five miles from the camera lens.
4. The new system does away with the present physical limitations of motion picture photography. Such makeshifts as closeups in order to show facial expression are now unnecessary.
5. Pictures giving the illusion of third-dimensional effect are thrown upon the screen, outlining every detail in its natural perspective.
6. Great spectacles, in all their magnitude and grandeur, vast outdoor scenes in their true perspective, may now be projected upon the motion picture screen.
7. Because of the specially wide film used in the new camera, an air blast is required to support the film as it travels through the projector.
8. The largest sound reproducing installation ever built by RCA Photophone, comprising a special arrangement of 16 large RCA Photophone moving coil cone loudspeakers, was used.

RCA Photophone Projector

By JOHN T. SAUERBORN

THE RCA motion picture projector and sound reproducer are contained in one mechanism, the upper part of which is similar to any standard projector. The lower part of the mechanism is, of course, the sound picture attachment. The operation of threading-up the projector in the upper part is similar to any other projector, but the procedure in threading the sound attachment is a bit different, due to a difference in design of the RCA machine.

After the film leaves the lower sprocket it is led over a compensator arm idler, then around a constant-speed drum, the position of which is between the sound optical system and the photo-electric cell compartment. The film then passes under a uniform-tension idler, and over a continuous-drive sprocket and then into the lower magazine. Projectionists will recognize in this procedure one of the simplest threading operations of any projector.

Threading Path Indicated

On the very latest RCA projector models, there has been painted within the mechanism a thin white line which conforms exactly to the path of the film when the machine is threaded and ready to run. Thus, a man may approach an RCA projector for the first time and proceed immediately to thread-up the machine, secure in the knowledge that he has only to follow the white line. This line also provides a check on the threading operation even after one has become familiar with the mechanism.



John T. Sauerborn

Reference to the accompanying illustration which shows in detail the mechanism of the RCA projector will enable one to trace each step outlined above—to note exactly the path of the film as it appears when the machine is threaded and ready to run.

Constant-Speed Drum

And now a word about the constant-speed drum. On other sound picture attachments the film is brought directly opposite the sound optical system by means of a sound gate. This method is, of course, practical, but it also demands that the projectionist be ever alert in seeing that the sound gate be kept clean and that the gate be shut tight. Once the sound becomes clogged, the quality of sound suffers. And there is another consideration the importance of which every projectionist will concede. This is the fact that in every aperture, regardless of make, the film is permitted a little play. This play afforded the film is permissible in silent pictures; but with sound film it allows the film to deviate a trifle from a perfectly true line-up with the optical system. The results of even a slight deviation are known to all projectionists.

This fact prompted RCA to provide another means for bringing the film in a perfectly true alignment with the optical system—a means which having once brought the film to a certain alignment, *absolutely* held it there. The constant-speed drum was the result. Referring to the illustration of the mechanism once more, we see this drum directly opposite the sound optical system. In the photograph it apears as a flat shiny surface, but in reality it is inverted. Imagine a teacup of the same size placed in the mechanism and you will have a mental picture of just what this drum looks like.

True Alignment Assured

This drum, around which the film is wound in the threading operation, brings the film into a perfectly true alignment with the sound optical system, and, what is more important, it holds it there perfectly in line. This feature of the RCA mechanism is one which every projectionist will appreciate.

Into the space permitted by the inverted (teacup) design of the drum is fitted the photo-electric cell compartment which is attached to the sound compartment door. (This door is not shown in the illustration.) The photo-electric cell compartment is completely enclosed, having only a small round glass on its upper left corner which allows passage for the light.

In threading the projector for sound film we leave a normal-size loop between the intermittent sprocket and the lower sprocket, then over the compensator arm and around the sound drum. This threading path gives us exactly 14½ inches of

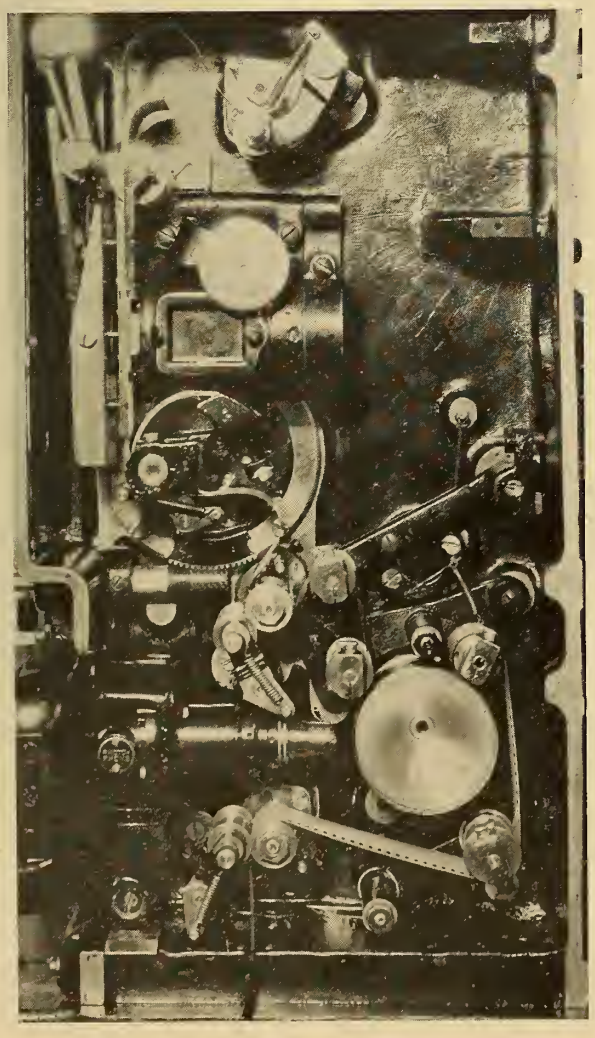
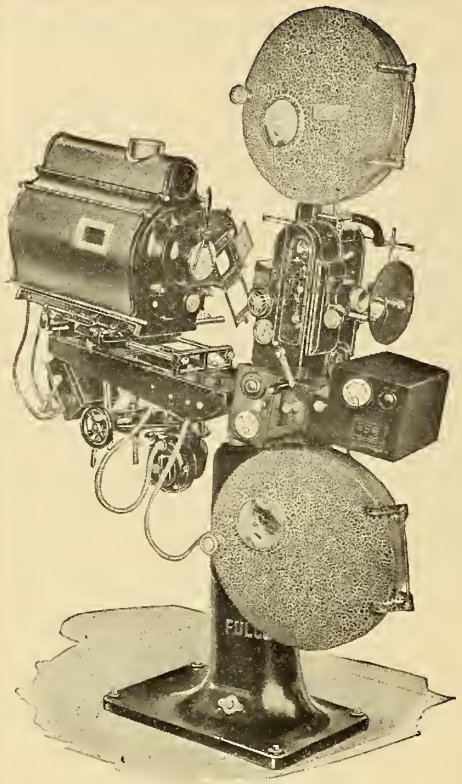


Fig. 1. Showing RCA projector mechanism and sound film compartment attachment. The method of threading this mechanism for sound pictures is clearly shown here. Note also the constant-speed drum, the function of which is described in detail in accompanying description. The photo-electric cell compartment is attached to a door which swings open to the right. The cell is completely enclosed in compartment which fits into the inverted drum. This is the first view of the RCA projector mechanism to be published in any periodical of general circulation.



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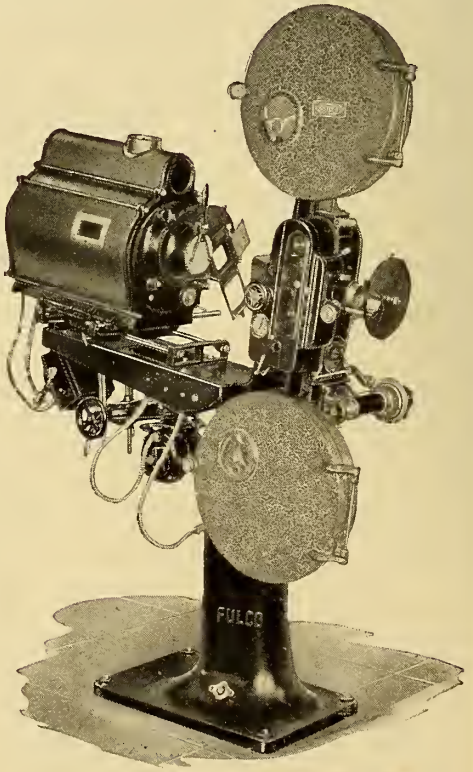
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WITHOUT SOUND ATTACHMENT



Fig. 2.—Starting magnetic pick-up on record

film between the center of the projection aperture and the center of the sound optical light ray, which is the normal distance for perfect synchronism.

If for any reason there is a shrinkage of film or loss of loop between the intermittent and the lower sprocket, the compensator will automatically change the ratio of the film feed so as to have at all times exactly 14½ inches of film between projection aperture and sound light ray. This compensator is still another precautionary measure which has been taken by RCA in order to insure perfect reproduction at all times.

Disc Operation

In using film with sound on disc, there is a clutch on the drive shaft of the disc attachment which is pushed in to mesh the gears between the projector mechanism and the disc attachment. This operation, together with the locking into its proper position of the compensator arm (on film side of projector), makes the projector ready for threading.

In threading the film for sound on disc operation, the frame with the word "Start" should be placed in the aperture opening. Then the record should be set on the turntable and the needle in the pickup arm placed carefully into the starting groove opposite the point on the arrow. The record clamp should be placed on the center pin so that it is setting tight on the record. Then turn projector by revolving the motor drive disc by hand to insure perfect tracking of the needle in groove. The projector is now ready for reproducing sound on disc in perfect synchronization with the film.

The internal parts of the projector mechanism are thoroughly provided with oil by means of a forced oil feed, which is governed by an oil pump located at the bottom of the projector case. This feed forces oil through a small feed pipe to the top of the projector case, after which the oil is distributed to each individual bearing gear and to the spindles. The flow of oil is governed by an individual valve which is adjustable.

Provision for oiling has been made as follows: on the film side of the projector there are 10 holes; 4 on the motor drive control; 1 on the revolving shutter shaft; 1 on the fire shutter governor housing; 2 on the take-up side of projector, and one oil cup on the disc-drive rod housing. Only one drop of oil a day is necessary on the film side of the projector; more than this will result in oil on the film.

The Compensator

A thorough knowledge of the action of the compensator is essential to producing perfectly synchronized pictures on the screen. The function of the compensator is to vary the sprocket hole speed so as to maintain a constant linear speed about the drum. The variance in sprocket hole speed and linear speed of the film is caused by film shrinkage, therefore when running sound film it is absolutely necessary that the compensator arm have a free up-and-down movement.

When using a record on the turntable it is also absolutely necessary that the compensator arm be locked in its proper position so that the compensator arm brake is positively free from the groove in the compensator. A failure to observe this injunction will result in the sound being thrown out of synchronization. Silent film also demands that the compensator arm be locked in its proper position.

To remove the film gate for cleaning or adjustment, lay first finger against the flat surface of the spring on top of film gate; then press spring toward the shutter housing, and pull the gate straight out. To replace the gate, simply reverse this process. To adjust the spring tension, tighten the bottom screw on flat spring. For a fine adjustment first adjust the top

(*Continued on page 27*)

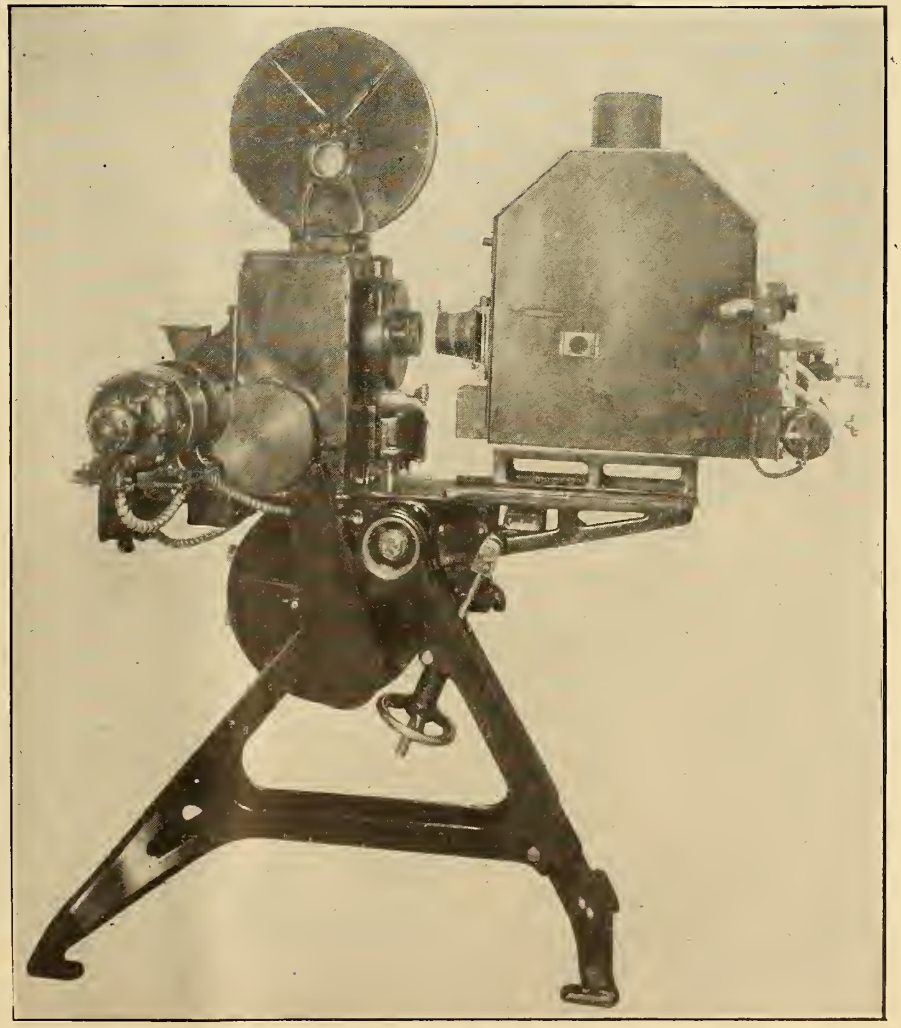


Fig. 3—Complete RCA model P2 projector

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Projection, A Specialized Art

By LESTER B. ISAAC

President, Projection Advisory Council



P. A. McGuire

II

UP to this point we have considered the work of the projectionist from a technical viewpoint, but we will now take up another highly important qualification he must possess. Projection is looked upon as a trade or a craft. It has been called a profession and timidly regarded as an art by a few people. The Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa., recently, however, in their advertising speak of "Projection, a Specialized Art." This advertisement attracted widespread attention, and gave those skeptics who held projection lightly something to think about.

Projection is unquestionably a highly specialized field, as we have tried to show in what has already been said regarding the necessary technical training. This knowledge can be acquired theoretically, but no one may really be considered a projectionist until he has had long practical experience.

An engineer from one of the great educational or commercial organizations might possess a complete knowledge of these important subjects and never make even a third-rate projectionist. A man may be a good machinist, a first-class repair man, or an expert electrician, and fail utterly as a projectionist. Some excellent sound engineers could never become projectionists—although the work may look easy enough to them—because they just don't fit into the theatrical field.

Projectionist a Showman

The motion picture industry is in the show business, and a man who does not realize that does not belong in it. No matter what other training an "operator" may have he will be just that and nothing more unless he knows the show business. A projectionist must be a showman. A showman must be a good deal of an artist, for there is nothing fixed or standardized about entertaining the public. In the writing of the story, in the taking and the making of the picture, and in the building and operating of the theatre, everything is done to catch the fancy of the patron, to amuse him. Any defect, anything that mars or interrupts the performance lessens the pleasure of the audience. The real showman must have the feeling of an artist in his efforts to hold his public.

The projectionist is an important part of the vast system entertaining the public through the medium of motion pictures. To the projectionist comes the final delivery of the finished product. All the work that has gone into a production before the finished print is delivered to a theatre is marred if the projection is bad. Projection cannot be produced on a quantity basis; each projectionist is direct-

(*Continued on page 28*)



Harry Rubin

As a projectionist of twenty-odd years' experience, I should like to express the opinion that the article "Projection, a Specialized Art" is the best statement on projectionists and their work that I have ever read. The work being produced by the majority of projectionists today is worthy of recognition—recognition long withheld but which is now being practically forced by sheer excellence in work. Experiences such as are mentioned in this article are common to our craft, and any man who today is a competent projectionist certainly is a specialist.

J. H. KEENER,
Secretary, Local 333
Charleston, S. C.

After reading "Projection, a Specialized Art" through twice, I find that it covers the subject thoroughly. As pointed out in this article the projectionist must be a showman, but he must also be a salesman: he must sell himself and his work to both his theatre and his audience. Within the craft the feeling is prevalent that the public which pays the bills must receive value for value—nothing less. The theatregoing public is gradually awakening to the importance of the projectionist and is constantly becoming more appreciative of quality work. I feel sure that, when our men are given good equipment and fair conditions, the craft as a whole is capable of fine work.

CHARLES O. SMITH,
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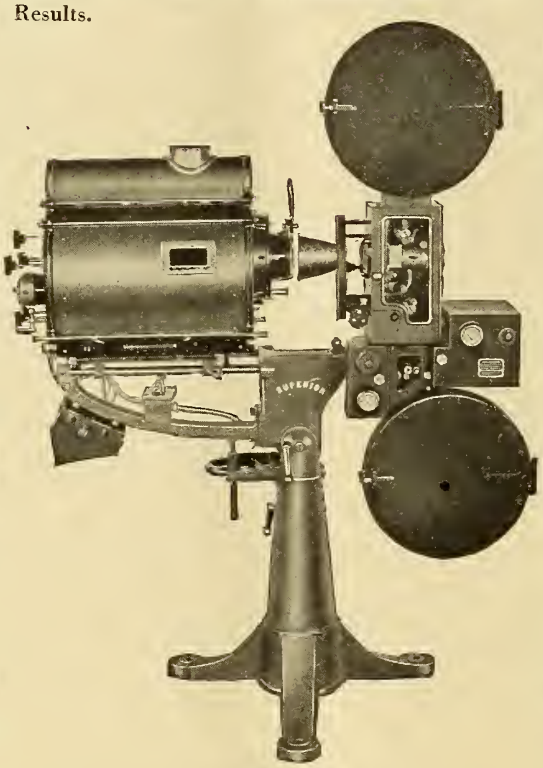
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De Forest Phonofilm System

DE FOREST sound picture systems are available in two sizes: the standard sound-on-film and disc apparatus (which combines both the Phonofilm and the Phonodisc attachments), and the Junior Model De Forest system which is suitable for theatres having 800 seats or less. De Forest guarantees the quality of both systems, the lower cost of the Junior Model being due to savings effected in the manufacturing process of the smaller equipment.

De Forest recording procedure follows conventional paths and approximates the procedure used by other sound picture producers. A gas-filled lamp, called the Photion light, is inserted in the camera a short distance away from the usual objective lens. The light from this Photion tube passes through an extremely narrow slit and falls directly upon one margin of the film. The film is driven continuously with an even speed, in front of this narrow slit, but with the usual intermittent step-by-step motion in front of the picture aperture.

The light in the Photion tube is generated by the electric current which is passing through the gas enclosed therein. The intensity of the light depends on the intensity of the electric current. This light therefore fluctuates in brightness hundreds or thousands of times a second in perfect rhythm with the telephonic current pulses, and varies in strength with the current.

This telephonic current originates in the first place from the special microphone transmitter which is quite unlike the ordinary telephonic microphone, but serving the same general purpose; this transmitter picks up the sound waves at distances of five to fifteen feet from the source of sound, transforming these sound waves into very weak telephonic currents. The audion

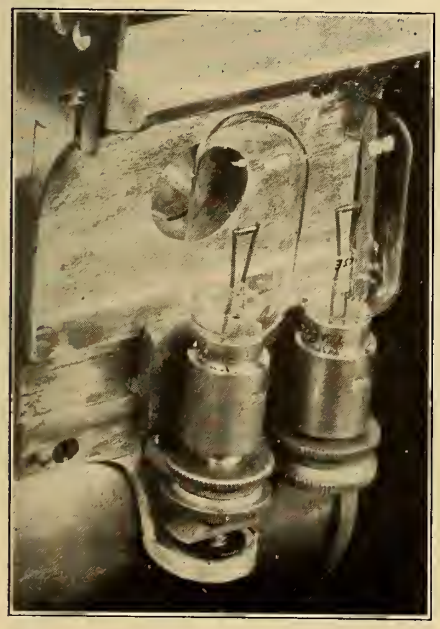


Fig. 2—Showing dual exciting lamps used by De Forest

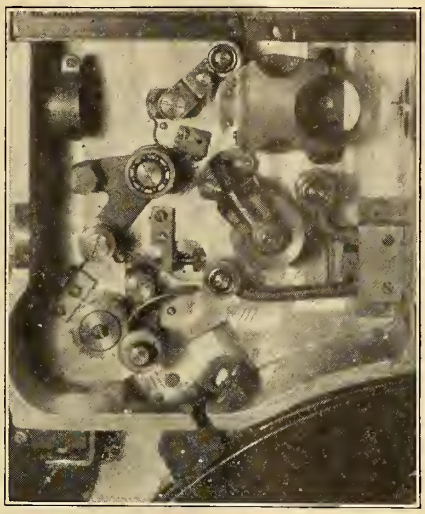


Fig. 1—De Forest sound compartment

amplifier is then used to amplify these weak currents 100,000 times to bring them up to sufficient strength to influence the Photion lamp in the camera.

Thus we have three transformations—first sound waves into electric currents, then the amplification of these currents into light waves, and the registering of these light waves through the narrow slit upon the photographic film.

Reproducing System

The De Forest reproduction attachment is similar to that of other systems in that it has similar exciting lamp and photo-electric cell compartments, a slit through which the light may pass from one to the other and the conventional sound gate. There are, of course, slight differences in De Forest design which distinguish the compartments from those of other producers. Just what these differences are may be learned by referring to the accompanying illustrations of the equipment.

De Forest employs the dual exciting lamp feature which enables the quick shift from one lamp to another in case of accident to one of the lamps. The exciting lamp base affords the opportunity of presetting the lamps, so that a quick turn of the hand effects the shift with only a slight break in sound reproduction. Vibration of the projector may throw the settings of these lamps off a trifle, but daily inspection before running the equipment will provide a check on the trueness of the alignment.

The De Forest system includes a single double-channel amplifying board. A feature of this panel is its minimum number of control dials, the accessibility of tubes and its trim compactness. De Forest installations are made with only one panel, no spare being furnished unless specifically requested.

The De Forest disc installation requires an absolute minimum of space, the turntable attachment being installed on the long side of the projector, so as not to jut out on the rear corner. The motor drive extends forward from the turntable and is counterbalanced on each side of the motor control by a flywheel. This drive equalizer insures absolute synchronism and eliminates the possibility of any lag between drive and projector.

Operating procedure for De Forest disc systems is similar to that of other systems, procedure for which has been outlined in detail in these columns.

For All Projectors

The De Forest sound film compartment is illustrated on this page and the method of threading will be made apparent by reference to the illustration. This attachment is now available for the following projectors: Simplex, Baird, Motiograph, Fulco, and Powers.

This description of the De Forest sound systems has touched on only the main parts of the equipment, the various other units—fader, batteries, amplifiers, etc.,—approximating similar equipments which have been described in detail in this publication from time to time, so that their inclusion herein would merely be a repetition of preceding material.

The purpose of this article is to provide projectionists with a general outline of the equipment which, together with photographs of the more important units, will serve as an introduction to the De Forest system.

Servicing of the equipment is directed from the De Forest headquarters in New York through a string of branch offices so situated as to insure quick service for installations in every territory.

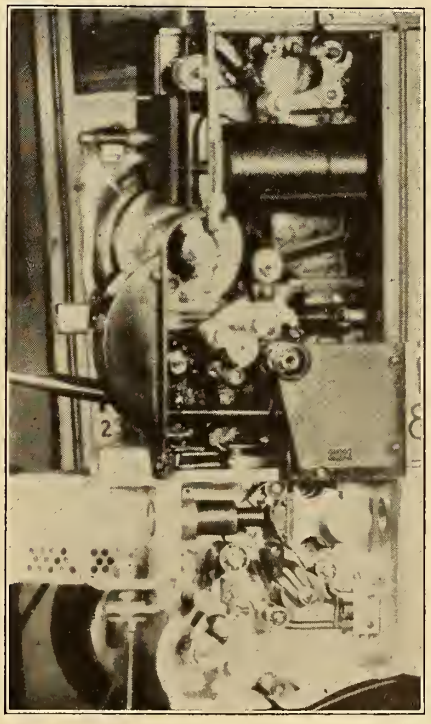
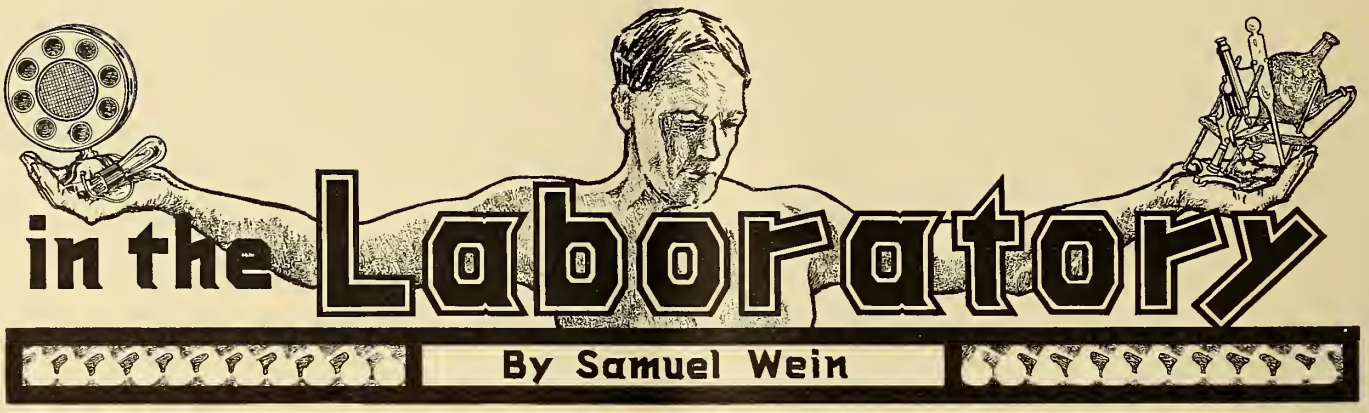


Fig. 3—De Forest attachment on standard projector



A New Department

Within the past five years many strides have been made in the motion picture art. These advances have been due almost wholly to the contributions made to the art by investigators in the various phases of chemistry and physics and to the aptitude displayed by these workers in applying the fruits of their work to practical uses.

And the end of this renaissance is not yet in sight, for hardly a day passes that does not bring news of some new and important contribution, some new development for which many claims are made. Every day the editorial offices of both the lay and technical press are flooded with releases upon this, that or the other development with respect to some phase of motion pictures —sound pictures, color photography, stereoscopic relief, etc.

While some of these over-publicized developments undoubtedly have merit, the majority of these "last word" inventions astonish one with their absurdity. It is often very difficult, however, for both technical and non-technical people to separate the wheat from the chaff with respect to these announcements. Most people have neither the time nor the inclination to chase the elusive truth through the columns of innumerable specialized technical publications.

For example:—Anyone interested in a certain phase of motion pictures might very easily have to consult at least a half-dozen periodicals before securing enough information to enable him to form a definite idea as to the worth, or lack of it, of that particular development. Sources of correlated information are all too few, especially in the motion picture field.

"In the Laboratory," under which heading this statement appears, will seek to fill this gap, to provide the busy worker in the industry with what might be termed the missing link between fact and fancy. THE MOTION PICTURE PROJECTIONIST considers itself fortunate in having secured Mr. Samuel Wein to edit this department.

Mr. Wein needs no introduction to the majority of our readers, for his articles on light sensitive cells in these columns from time to time have served him far better than any formal introduction. Mr. Wein, a physicist of note, will contribute to this department not only the knowledge gained from twenty-seven years' experience as an investigator in the electro-technical field but also many valuable references from his extensive library which contains more than 50,000 cross-indexed references on the divers subjects mentioned in the accompanying schedule.

The value of this department to our readers will largely depend on the measure of cooperation which is extended Mr. Wein in his efforts to make the service as interesting and as thorough as possible.

It is a source of great satisfaction to us to have Mr. Wein associated with us as Editor of "In the Laboratory," and we feel sure that his work will receive a hearty welcome from our readers. —THE EDITOR

THE adaptation of physical and chemical phenomena to the industrial arts is becoming more pronounced every day. A few short months ago these phenomena were but the results of a number of observations made by some academician or experimenter; today these results have found practical application and are used industrially as the basis for business enterprises backed by millions of dollars and in which many thousands are given employment.

It is the purpose of this department to set forth in future issues of this publication just what bearing the work of the laboratory technician has upon the product of the commercial manufacturer. The point the writer wishes to convey is that much of the future's progress depends directly upon the personnel of the technical staffs employed by industrial firms which encourage the development of many important contributions to the motion picture art.

These contributions are not, we may be sure, hurriedly conceived and worked out. The progress of any industry depends directly upon the knowledge and experience of investigators who busy themselves with a given subject and who slowly but surely work out their problems until their goal is attained. Such progress is slow, but, for this reason, the results obtained are no less certain.

The writer has been identified for twenty-seven years as an experimenter and contributor to the art and science of "light and its effect" on the elements and compounds, as well as with the correlated phenomena of acoustics, etc. During this period he has collected for his own use more than 50,000 references pertaining to this specialized art. These resources of knowledge and reference will be placed entirely at the disposal of the readers of this department.

Aim of the Department

The purpose of this department will be to set forth in their logical order the facts concerning all new developments in the field of sound motion pictures. These facts will be interspersed from time to time with references relating to the early work on sound pictures, thus enabling the reader to become fully acquainted with the gradual development of the art. The importance of patent rights to certain sound picture equipments should be recognized, and we shall offer such references on patent matters as the occasion may demand. In the main, however, we shall concern ourselves from month to month with practical technical facts. We shall make every endeavor to present information in a clear and concise manner, so that the essential points of the subject shall not be lost in a maze of superfluous words.

The success of this department is contingent directly upon the cooperation of our readers. We shall welcome the opportunity of knowing your individual problems and of answering them in this department. We repeat: this department is for your use, and we fear that it will lose much of its effectiveness should you fail to utilize it to the fullest extent.

By way of illustration there is appended here a list of subjects we purpose covering, and it is on these subjects that we invite correspondence. We might add that we appeal not only to the academic contributor and the engineer but to the practical man as well. After all, it is the practical man whom we wish to serve, and in working out his everyday problems we shall be rendering an important service to the engineer and to the laboratory worker.—SAMUEL WEIN.

Stereoscopic Relief

WITHIN the past few months there were given several private demonstrations of what was represented as being "stereoscopic relief." We witnessed one of these demonstrations, and failed to see any "stereoscopic relief" at all. This same system was demonstrated more than ten years ago, and the results viewed recently

were hardly any noticeable improvement on those witnessed ten years ago.

It might be interesting to digress here and seek to supply a definition of terms, without which any technical discussion is likely to come to naught. In Webster's dictionary "stereoscope" is referred to as "a binocular optical instrument by means of which *two pictures appear as one and stand out in relief;*" as to the term "relief," Webster refers to it as the "projection of a sculptured design from the plane surface."

Depth vs. Relief

What was actually seen in the recent demonstration was an effect which resembled images in slight "depth," which is the reverse of relief. This "depth" was apparent only in scenes where a waterfall was in the foreground, and in the distant background were seen bridges, buildings, etc. The waterfall was seen to pass from the left side of the screen to the right side. As an effect it was novel and interesting indeed; but one would hesitate to term it "relief."

Similar effects may be seen when a film is projected that was originally photographed from a moving train, and with the lens focused on the immediate foreground. A number of years ago the same effect was witnessed in that classic motion picture "Caberia," several scenes of which actually presented images with slight depth.

Stereoscopic relief is seen only because of certain physiological reasons which are simulated by the brain through the medium of the eyes. Were we more conversant with the reason for this physiological action, we would then be able more readliy to produce motion pictures in stereoscopic relief.

Use of Analyzers

The only logical methods for producing this physiological effect simulating stereoscopic relief is by making two photographic images at a slight angle from one another and then projecting these images alternately. Another method is to witness the two images with color filters which are "complimentary" to the two colored images printed one over the other on the film. It is quite obvious that this method demands that the person in the theatre must look on the screen with the two colored filters.

This latter method was demonstrated several years ago in a few motion picture theatres along Broadway, but it soon fell by the wayside because audiences could not be "educated" to wear glasses even to see motion pictures in relief. The results obtained by this method were very startling, and without question true stereoscopic relief and depth was seen at all times.

Anyone who is seriously interested in the subject of stereoscopic relief can do no better than to refer to that most exhaustive and complete bibliography on the subject by the late Dr. E. J. Wall in the Transactions of the S. M. P. E. for February, 1927, pages 326-44.

Next Month

With the next issue we shall begin to discuss the various subjects listed in the classification on our right, observing the same chronological order whenever possible.

Classification of Subjects

Sound Recording Methods.

1. Mechancial
2. Electrical
3. Photographic
4. Magnetic
5. Electrolytic

Of the five methods outlined above only two are used commercially. The others are of interest only from a purely experimental viewpoint and will not be considered here. The two commercial methods referred to are: (1) the electrical actuation of a "cutting tool," e.g., diamond or sapphire, as in the case of manufacturing the common phonographic disc record; and (2) the photographic recording of light variations, resulting from sound variations, on the film. This latter method covers (a) the variable density, and (b) the variable area (saw-tooth), methods. These methods may be classified in the following order:

(a) Vibrating diaphragms
(b) Vibrating mirrors
(c) Manomatric flames
(d) Polarized light
(e) Piezo effect
(f) Magnetic effect on liquids
(g) Incandescent lamps
(h) Varying magnetic fields
(i) Oscillating arcs
(j) Gas-filled tubes

The foregoing classification shows the various means and devices which are used from time to time for sound recording.

Reproduction Methods

The reproducing methods may be classified into two sections: (1) electrical "pick-ups" by which sound from a disc record is converted into electrical variations by means of magnetic or capacity changes, and (2) optical means. For the first classification the following types are suggested:

(a) Resistance change
(b) Induction (magnetic)
(c) Capacity (electrostatic)
(d) Light (photophonic)

We come now to the methods of reproducing sound from film. The known methods are:

(a) Light sensitive cells
(b) Thermo-electric cells
(c) Capacity change
(d) Resistance change
(e) Compressed air
(f) Ionization of gases
(g) Magnetic change

Loud Speakers

A loud speaker for any type of sound reproduction may be classified under the following headings:

(a) Magnetic
(b) Dynamic
(c) Capacity
(d) Compressed air

Slots for Reproducing and Recording Purposes

In recording and reproducing sound from film use is made of a slot, slit, or orifice, and these are classified as follows:

(a) Mechanical
(b) Optical
(c) Photographic

Amplifier Tubes

(a) Two- three- and four-element tubes
(b) Characteristics of tubes

Amplifier Circuits

(a) Resistance coupling
(b) Impedance coupling.
(c) Transformer coupling
(d) Complex circuits
(e) Cascading

Synchronizing Means

Synchronization in both recording and reproducing sound is accomplished by the following methods:

(a) Mechanical
(b) Synchronous motors
(c) Brush motors
(d) Tuning forks
(e) Vacuum tube oscillator
(f) Piezo effect

Sources of Potential

Various potentials are used for operating the carbon arc; the a, b, and c potentials used in amplifying circuits are:

(a) Powerhouse, A.C. and D.C. generators
(b) Batteries, dry and storage
(c) Battery eliminators

Photographic Processes

(a) Developing
(b) Toning
(c) Special processes

Stereoscopic Relief

The plastic relief of images on screens, by means of:

(a) Optical methods
(b) Color contrast

Projectors

The projector proper may be classified as:

(a) Mechanical movements
(b) Optical means

We believe we have exhausted at this time the list of subjects which might be expected to be discussed in this department. However, as we progress there may be occasion to either reclassify some of these groups, or to add additional subjects. It is urgently requested, however, that all who are interested in any special subject listed above will inform us of their particular interest, thus enabling us to supply the required information.

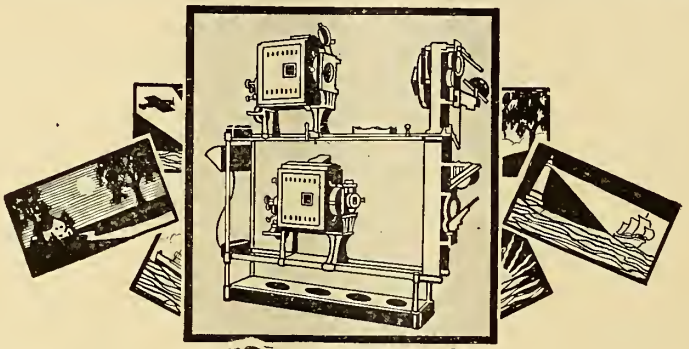
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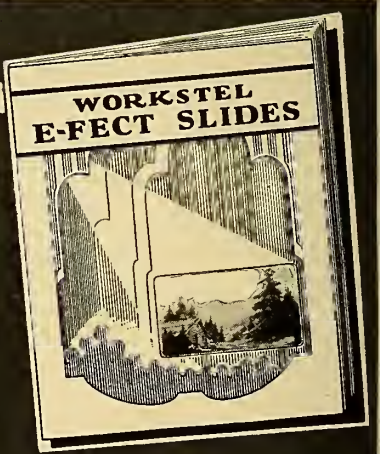
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THEATRE_____
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* *Please do not fail to mention if you are Owner-Manager or Projectionist.*

Organ-like Lumitone for Effect Lighting

EFFECTIVE lighting, stage and auditorium, has always been a problem to the conscientious theatre man, whether he be a projectionist or a stagehand. Until now he has been hampered by inadequate working facilities. His switchboard, if he was a projectionist, was usually located in one of the side or rear walls of the projection booth; if a stagehand, somewhere off in the wings of the stage. Rarely, if ever, was a theatre built in which the switchboard was located so advantageously that it permitted its operator a full view of the stage or auditorium. The problem,

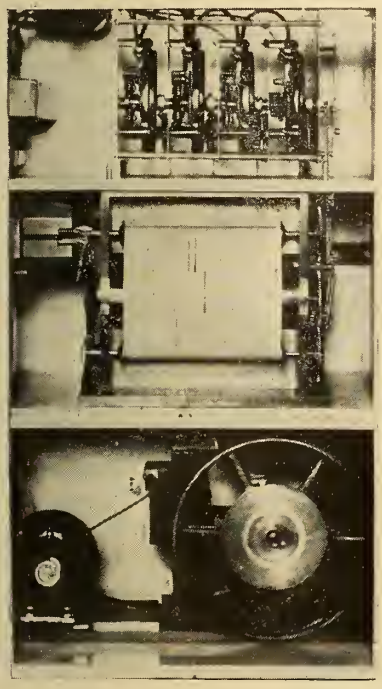


Fig. 1—Showing driving apparatus and color control roll

therefore, was to devise some method or plan of construction arrangement whereby the operator of the lighting controls could work the controls and at the same time remain "out front."

As a solution for this problem the Lumitone Corporation of America has announced the completion of Lumitone, a device having controls similar to the keys of an organ and which is operated like an organ either from a console or from a roll. Reds, ambers, greens and blues are no longer fixed colors, for this device blends them, shades them, accentuates and retards, and gives them infinite variety.

The instrument can be placed in the orchestra pit or at any other advantageous point, permitting its operator to control every movement of the switchboard with the result in full view. The operator cues light to each particular scene or setting, just as the organist cues music. Entire acts can be set up to any number in advance and brought in by simply touching a button. Additional colors can be added or detracted from the original set-up instantly, if desired.

This new control will move the dimmers in three or more speeds, both forward and

(*Continued on page* 35)

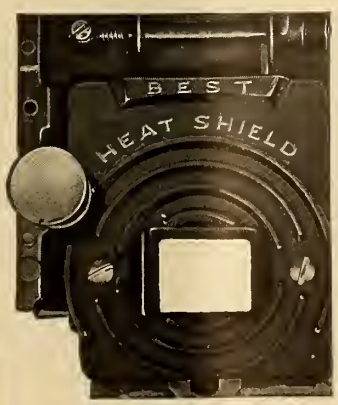
The very best in

SOUND

TODAY—in this era of sound pictures—there is a higher premium than ever before on film uniformity. For *sound* quality is even more sensitive than *screen* quality to any variation in the film.

If your "talkie" prints are on Eastman film—famous for uniformity—your patrons are seeing and hearing the very best that this greatest development in motion pictures has to offer.

EASTMAN KODAK COMPANY
ROCHESTER, NEW YORK



Keep your Simplex
cool with a
"BEST"
HEAT Shield
Your dealer has them. Price $3.
BEST DEVICES CO.
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THE LENS THAT PUTS PERFECTION IN PROJECTION

Outstanding Projectionists Indorse



The NEW ILEX

F: 2. 5

When Ilex first announced the new projection lens F:2.5 we were satisfied in our own minds of the superiority of this remarkable lens with its seven outstanding advantages.

Now—we have the written words of projectionists in all parts of the country telling in glowing terms of the advantages of the new Ilex. We quote:

". . . The Ilex lens does produce exceptionally good results. The focus is very sharp and the definition over the entire field of picture surface was exceptionally noted. We can unhesitatingly recommend the Ilex lens to anyone who might be in the market for a truly high grade lens. . ."

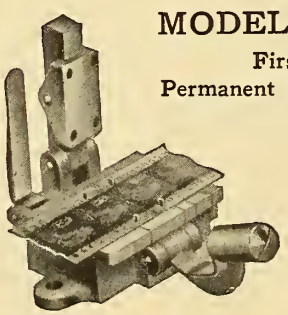
". . . I wish to say that I found the new Ilex Projection Lens F:2.5 to be all that you claim. It projects an A-1 picture. . ."

For those who desire the very finest in motion picture projection, we recommend the new Ilex Projection Lens F:2.5, the most outstanding advance in projection optics in recent years.

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Universal Film Splicing Machine



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Education on "Sound" for the Projectionist

By DAVID MOSES

The necessity for full cooperation by manufacturers of projection equipment in making available information on their products has been stressed repeatedly by THE MOTION PICTURE PROJECTIONIST. *Comments on the topic of education which appeared in the last several issues continue to elicit replies from projectionists throughout the country. The following communication from David Moses, a member of Local 306, expresses what probably is a majority opinion in the craft on this important topic:*

THE mere fact that a man receives a license to operate a motion picture machine does not make him a projectionist nor even a so-called operator. Most licensed men become projectionists only after long working experience—usually at the expense of the equipment, the theatre management, and, not infrequently, the audience. These projectionists are now called upon to educate themselves in (for them) a new field—sound projection. And one may not become adept in this work at the expense of the equipment, the theatre, and the audience. He must jump right in and do a workmanlike job from the word "go."

Leading men in the industry demand that projectionists be educated in their new work quickly and thoroughly. Up to the present this has not been done. Various reasons are advanced for this lax handling of the situation: one says that the responsibility lies with the sound equipment manufacturers; another says that projectionists are to blame in being unable to learn fast enough; still another says that some projectionists do not care to learn, while others are eager for information but have no means of obtaining it.

Manufacturers Cooperate

It can be proven that the manufacturers and their engineers are trying their utmost to solve this problem. In the case of Western Electric, we find their engineers are making an earnest effort to instruct each projectionist in the care of the equipment. Instruction books furnished by W. E. cover the essentials of operation and upkeep. Lecturers from the company are always available. Despite the claim of a certain speaker at the recent S. M. P. E. meeting that "There has been a tendency on the part of the manufacturers to wrap an air of mystery around the whole thing," I should like to state that complete diagrams of their circuits and valves are found on the covers of each section of the apparatus for reference by anyone interested.

Rather I should say that it is the mode of their teaching and the manner of their lectures that are at fault. These lectures generally touch two extremes: (1) the projectionist is told which switch to turn first and which to turn next, and (2) the place selected for the lecture is never adequate and does not permit the installation of necessary equipment.

To illustrate this point: A school was held last summer in a certain projection

room where a group of men were instructed in the operation of sound equipment. They were shown a sound system and were told the order in which the switches should be turned in order to get sound. When the instructor was asked what supplies the plate voltage on the 41-A amplifier, he responded by saying that he was not supposed to explain the workings of the inside of the amplifier.

Now of just what value was such instruction to men who were not placed on sound work until months later? By that time they either forgot the order of switching, or a certain switch would be found several inches away from its former position and therefore confusing to the men.

Need Simplified Explanations

Another extreme is that an engineer lectures in highly technical terms and fails to consider the comparatively limited knowledge of the subject by the majority of his audience. Last winter a lecture was given by a well-known engineer at a midnight meeting of a projection society in a Broadway theatre. To say that the lecture was a disappointment would appear to be an extreme statement, yet that was the consensus of opinion of those present.

Part of the audience consisted of men who were not familiar with the equipment, and to this group the lecture was practically unintelligible. The remainder of the men comprised two classes: those who had a knowledge of fundamentals and were able to understand the instruction books which formed the basis of the lecture. This group gained no additional information that night. The second group did not understand the instruction books, thus they failed to understand the discussion.

The projectionists are not to blame for any slips they may make with sound equipment, because the majority of them DO want to learn and KNOW how to go about it but are not provided with a guiding hand by the proper persons. In order to master a technical problem one must know the underlying principles and fundamentals involved, and the problem must be demonstrated to one in a PRACTICAL manner.

A Model School

The following description of an existing school will illustrate the effectiveness and usefulness of the method employed. Recently a small theatre circuit in Brooklyn installed synchronous reproducing equipment in all its houses. Out of the 35 men engaged with this circuit to operate the equipment only two had had previous sound picture experience. Out of the remaining 33 men 27 were not only new to sound projection but also comparatively new in regular or visual projection. But the management wisely protected itself against any emergency by securing an experienced man as chief. The major duty of this chief was to effect prompt repair in case of a breakdown in any of the houses. And with the first week there were three or four "No Sound" calls each day.

One day the chief decided that all the men should profit by the errors made in each theatre. Thus a school was formed.

On a designated night at midnight all the men of the circuit would congregate at a certain theatre's projection room. There, as the first order of business, the men who had had trouble during the week just past would be called upon to explain the nature of the trouble—how it started, what course it took and how it finally was remedied. The room equipment was used to demonstrate the points outlined, thus the men could see the problem exactly as it might be presented to them in their own rooms.

Following this the chief would explain how to prevent this, that or the other particular trouble, the while using the equipment for practical demonstration. Also, all known emergency measures that could be effected by the projectionist in case of trouble were actually shown by use of the apparatus before them. The men, then, were able to return to their own equipment the next day and test out the procedure they had seen the night before.

From participating in the above experiment, from attending various lectures outside of the school and from conversation with men in the craft, I draw the following conclusions: (1) Men not actually working on sound equipment should be encouraged to attend any and all lectures on sound. (2) Men working on sound should regularly be given instruction similar to the above outline. (3) No lectures should be given in lecture halls or any place where the apparatus being discussed is not in actual evidence. (4) Visual projection problems should not be sacrificed to the necessities of the sound situation. (5)

(*Continued on next page*)

Two New Improvements for the booth

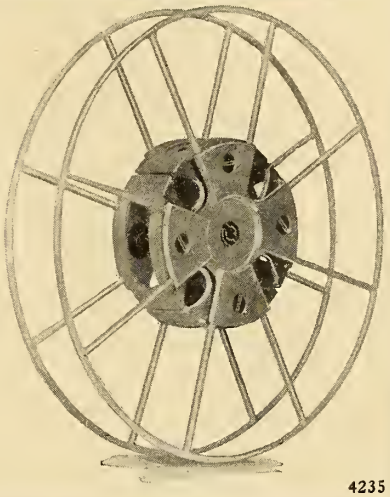
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

National Theatre Supply Company

Branches in All Principal Cities

THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

Three sizes. Eleven inch, $4.75 *F. O. B. Factory.*



4235



THERE are a hundred uses for this soldering iron in a projection room. This new electric iron eliminates the serious fire hazard and saves the time and trouble involved in the use of old style flame-heated irons. It may be used interchangeably with a melting cup or soldering tip, as illustrated. Convenient, reliable and economical.

Prices on request

WALKER SOUNDSCREEN

No loss of light or definition with sound pictures

A SURFACE of much greater reflective efficiency, which distributes light evenly to all sections of the theatre, producing a sharper contrast between black and white, is today delivering better projection results than have been obtained heretofore on solid screens.

Loss of definition has been overcome by the uniform arrangement of perforations, but without parallel rows of holes being formed, which interfere with sharp reproduction of moving objects.

SELECTED AS STANDARD EQUIPMENT BY PUBLIX, FOX AND MANY OTHER LARGE CIRCUITS. THE FINEST HOUSE IN YOUR CITY PROBABLY HAS A WALKER SOUNDSCREEN.

WALKER SCREEN CO.

85—35th St. Brooklyn, N. Y.

Toronto Chapter A. P. S. at "Synchronized" Banquet

HEREWITH is presented the menu for the first annual banquet of Toronto (Can.), Chapter No. 9 of the American Projection Society held in that city on May 7th. Sound pictures having entered Toronto recently, it is quite evident from a glance at the menu that the Arrangements Chairman was in a slight daze after his first contact with the apparatus.

MENU

Out-of-Focus Cocktail
Synchronized Tomato Zoup
(Increased) Celery Educated Olives
Amplified Baked White Fish
Roast Spring Chicken,
Roller Pin Movement
Hi-Lo Sauce
Fried Potatoes in Intermittent Grease
Gloria Swanson Peas Melotone Beans
Photophone Salad
Deep Movietone Apple Pudding
Vitaphone Whipped Cream
Non Synchronized Coffee Pick-Up Prunes
Ionized Ice Cream Short Circuit Cake
Carbonized Cigars

The Banquet Committee for the affair was: H. C. Jarmain, Chairman; T. Marsden, E. Darling, N. Tanner and G. Tucker. W. Ayres was master of ceremonies. Officers of Chapter No. 9, A.P.S., are: President, H. N. Elliott; Vice-President, R. C. Higgins; Treasurer, George O'Brien; Secretary, A. Milligan; Sergeant-at-Arms, A. Byford. On the Board of Governors are George Robinson and S. Milligan. W. S. Armstrong is the Chapter's technical instructor.

Education on "Sound"

(*Continued from page* 25)

Classes should number not more than 25 men.

It is up to the chiefs of each circuit to take the initiative in establishing such schools. The instructors should not be sound equipment company engineers but projectionists having a better than average knowledge of the equipment. Men with such qualifications may be found in numbers in both small and so-called de luxe houses.

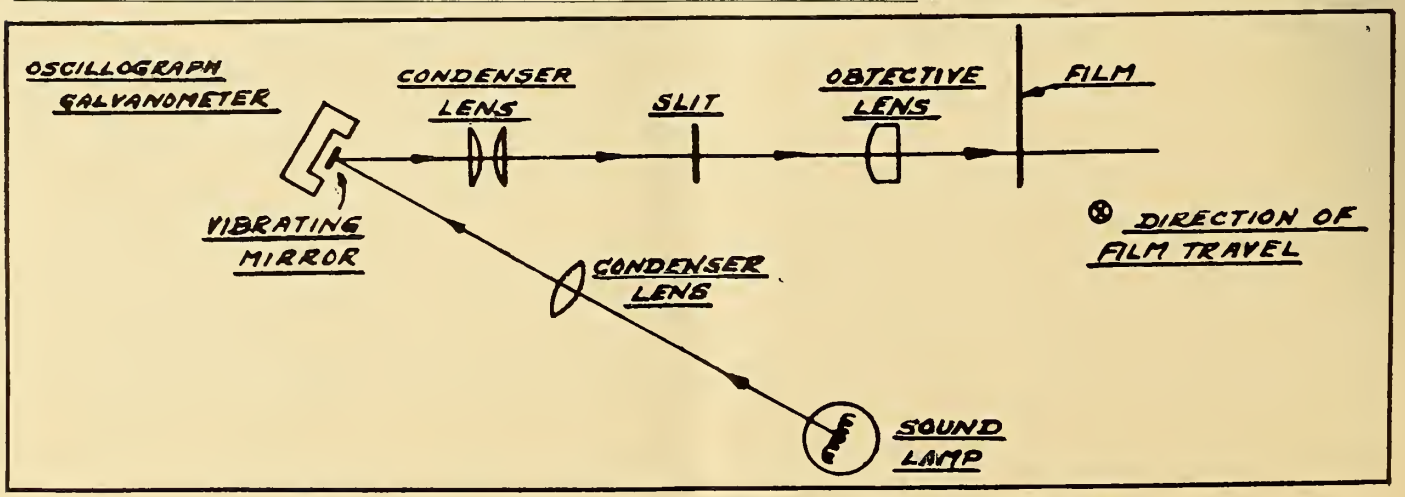


Fig. 4—Schematic diagram of RCA Photophone sound film recording system

RCA Photophone Projector Sound System

(*Continued from page* 15)

screw on flat spring and adjust the tension while the film is running at 90 feet per minute.

Features of RCA Projector

A comprehensive idea of the quality of the new RCA projector may be had from the following summary of comparisons prepared by me after many months of work with the machine:

1. A readily accessible mechanism. Projectionist has plenty of room for threading film in mechanism. Projector parts are not cramped in close quarters so as to retard rapid lacing of film in the event of breakage.
2. Uniform aperture tension, simple to adjust, giving a rock-steady picture on the screen.



Fig. 5—View of control switches for RCA P2 sound projector

3. Revolving shutter between film and arc lamp which tends to eliminate heating of film, buckling and warping.
4. Lubrication is semi-automatic. Gear side revolves in oil which is fed by an automatic pump.
5. Fire shutter with centrifugal governor action which is always positive.
6. All revolving parts of mechanism are totally enclosed, thus keeping out all dust and dirt.
7. Provision for adjustment of setting shutter while running.
8. Positive take-up, the tension on take-up depending on the weight of reel. Film cannot be damaged owing to even tension at all times.
9. Double-bearing intermittent movement.
10. Ready change of aperture plate while running sound or silent film.
11. Motor drives: two 3-phase motors are used with a selector switch, a simple turn of which gives a variable speed. Regulator is most conveniently located for projectionist. One motor is of constant speed for silent pictures.
12. Two exciter lamps, pre-set, are mounted in compartment. If one should burn out, a simple turn of the switch throws the other in focus.
13. Fader switch mounted on film side of projector in most convenient place for projectionist.
14. Rock-steady base, which is easily adjustable to all angles.



L. U. 650 Memorial Service

Memorial services for deceased members of Local Union 650 were held on Memorial Day, with the entire membership participating in the services. Wreaths were placed on the graves of four brothers who died since this Local was chartered.

Local 650 plans to make these memorial services a yearly fixture.

50 ERPI Men to England

Fifty ERPI men have been sent to England to install Western sound picture apparatus in more than 130 British theaters by Fall. The group is composed of one superintendent, three office men, four supervisors, thirty-one engineers, six inspectors and five projectionists.

The Watch Dog

guarding your steady, uniform current supply.

In the present change from SIGHT to SOUND, the public is more critical than ever before—and rightly so.

An even, non-variable voltage is the foundation upon which all successful projection rests.

It is obtained—economically so—thru the TRANSVERTER, as thousands of Theatres thruout the world will testify.

Remember, there is a Transverter, in type and rating, that will *exactly meet your projection needs.*

Sold in the U. S. A. by
The National Theatre Supply Co.

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THE HERTNER ELECTRIC COMPANY
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12688 Elmwood Avenue Cleveland, Ohio, U. S. A.

Exclusive Manufacturers of the Transverter.

Order Your FOLDER Now!

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Projection, a Specialized Art

(*Continued from page* 17)

ly responsible for the quality of his own work. It is only by maintaining the highest standards in the projection room and encouraging the projectionist to do good work that we can hope to secure the best possible results and, once attained, in maintaining a high standard.

No man will ever be a first-class projectionist unless he knows and likes the show business. He must have a viewpoint and live a life which is different from that of the ordinary technician.

All in a Day's Work

Some men acquire this viewpoint with comparative ease; and some never do. "The show must go on," and the man who does not realize this does not belong in the theatrical field. The true projectionist must have a fundamental training as a technician, but he must have considerably more than this which is only acquired through natural aptitude and practical training.

A projectionist must have a good idea of the speed which gives the best interpretation of the particular subject shown. He must know how to make up schedules, how to hold to them and what to do in emergencies. He must exert himself to keep the public from knowing when anything goes wrong. The alert projectionist anticipates troubles and by a thorough inspection safeguards against defects or breakdowns. Despite all of his precautions, and sometimes through conditions beyond his control, things go wrong.

The article by Mr. Lester Isaac on "Projection, a Specialized Art" is extremely interesting to me. I have experienced a great feeling of satisfaction and pride of late because of the fact that the ambitious, forward-looking projectionist who was constantly improving his knowledge of projection has at last gained the recognition he so richly deserved. Being aware of the added responsibilities which are his, no less than the rapidly increasing prestige of his craft, the matter of maintaining the high standards of work is squarely up to the individual man.

F. B. SPENCER,
Secretary Local 253,
Rochester, N. Y.

It is the job of the projectionist to overcome these difficulties as quickly as possible, and if he has the true spirit of the showman, he will not spare himself in order to get things going smoothly again. Such a man under such conditions is not merely thinking of his job or of his money. It is his desire to give the public a perfect performance.

Again we say it is this spirit in conjunction with his knowledge and training that makes the projectionist a showman and an artist. The mere technician cannot get this feeling and will therefore never be a good projectionist.

It is true that there are some pretty poor "operators" who get by as projectionists, but there are misfits in all fields of

endeavor. There are shoemakers who would make good doctors, and vice versa. We say this without reflecting upon the worthy men engaged in these widely differing fields. Being a projectionist and drawing good pay with short hours may appear to be an easy livelihood, but people on the outside do not realize what the projectionist has done to get where he is today.

Advanced by Hard Work

Not all projectionists are drawing big pay by any means, and for the most part those who are holding good positions have fairly earned their success. They came into the industry when the pay was poor, the work hard, and the outlook discouraging. With the tremendous expansion of the industry it is no more than reasonable that the men in the technical departments should also share in the benefits that come with success. The motion picture industry absolutely depends upon the highly specialized skill of the expert projectionist. Without his knowledge and training, visual and sound projection as a means of entertaining the public would not be possible.

We have not referred heretofore to the work of the projectionist when there are spots, floods and effect machines to be manned; then there is additional need for showmanship, and the chief projectionist should have considerable executive ability. With the frequent changes and the exacting requirements of the modern motion picture theatre, the entire performance depends upon the highly specialized training of the projectionist. That, however, is a subject on which the Projection Advisory Council hopes to develop more information.

The projectionist must take his responsibility seriously if he expects others to place a proper value upon his work. He must realize that his is a highly specialized field, and that it is important to keep himself thoroughly posted regarding present-day requirements and future developments.

A Specialized Art

When a man has a practical knowledge of optics, electricity and mechanics—when he has learned how to handle a delicate and inflammable material in conjunction with a high amperage illuminant—knows time, color, and sound—has experienced the peculiarities of managers and the sensibilities of actors and musicians—when he has learned how to work irregular hours during 365 days in the year—and when he can work effectively with constantly changing associates in what is very often an improperly designed and constructed projection room—when he has merged all this he becomes a showman and a projectionist. As the showman must be an artist so must the projectionist be an artist.

Are we not justified in agreeing with Westinghouse:—*Projection a Specialized Art?*

Note: This is the second of a series of articles, prepared from material contained in Projection Advisory Council reports, which will appear in THE MOTION PICTURE PROJECTIONIST from time to time.

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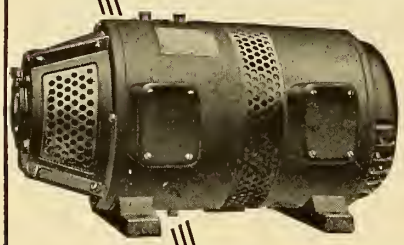
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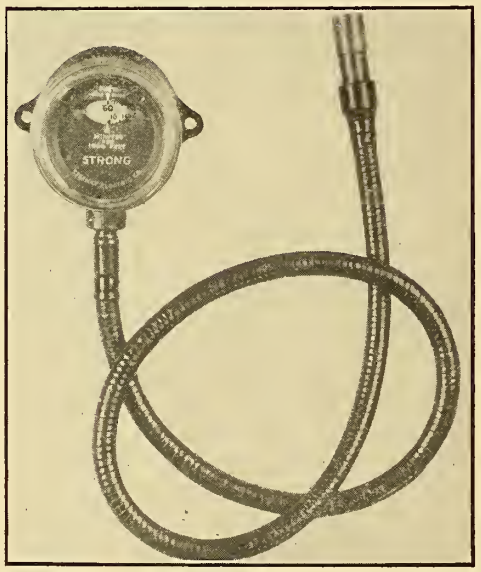
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Spoor-Berggren Process Shown by RCA

(*Continued from page* 12)

images of present-day motion picture photography are eliminated for pictures that retain all the natural imagery, shading and proportion of the objects photographed. Recorded on the usual panchromatic motion picture film, differing only in that the film is approximately twice as wide as the ordinary film, the projected picture can be made to cover a screen filling the entire stage opening of the largest theatre.

"Natural Vision"

The natural vision system of motion picture projection does not produce merely magnified objects, formerly shown on enlarged screens. The new screen serves to contain the widely increased limits of picture which the special width film of this system embraces, and to heighten the natural vision effect. Actually, human figures on this screen closely approximate natural proportions.

In the Spoor-Berggren system, according to the inventors, the picture starts with the screen and extends into the background. The picture retains the real, natural perspective of all objects photographed, because a camera focus approximating that of the human eye is contained in the special lens system. The new camera captures two images and resolves them into a single picture on a special width film, bringing to the negative the full relative shadow values of the photographed object.

Unrestricted Angle of Vision

Optically, the projected picture permits the spectator's eye to see with natural vision what the special lens system (in effect an eye itself), sees in photographing the scene. The new lens system gives a widely increased angle of vision over the scene being "shot," thereby permitting close-up views of groups instead of individuals. Thus, the facial expressions and reactions of a number of persons may be noted simultaneously where, heretofore, in standard motion picture work the camera has been forced by its restricted angle of vision to concentrate on individuals. The importance of this element to the filming of stage plays and musical comedy is very great, allowing full-stage action to be photographed in one picture with complete detail of the players' actions and expressions.

In explaining the relation of the lens system to the eye, it was stated that the double perspective or image action of the eye was eliminated, retaining only the double-angle shadow effect which in normal vision gives objects their three-dimensional characteristics. The human eye normally represses double perspective, except in cases where intoxication or a similar condition paralyzes automatic control of the optical system, causing the eye to see two images. In this respect, again, the new camera duplicates the human eye, except that it continually corrects for the double image,

photographing only the double-angle shadow.

Simulate Third Dimension

By means of this double-angle shadow, motion pictures that are flat and two-dimensional, will simulate three-dimensional objects with all the warmth of light and dark shading which gives depth and space in normal vision. The contours, flat areas, vistas, and panoramas in the range of the Spoor-Berggren camera "eyes" will be recorded on film as they are; delicately shaded in curvature, or reaching back in straight lines of true perspective; in other words, modeled, to use a scupltor's phrase, in their true physical and optical proportions as the eye sees them with normal vision.

The Spoor-Berggren camera resembles the ordinary motion picture camera in external appearance, except that the magazine cases that carry the film are larger to accommodate the wide film. As many as 1,000 feet of film can be carried in these magazines, the maximum footage which is employed in current standard-size film practice. Thus, with the addition of sound, lengthy sequences of singing, talking and sound action may be filmed without a break for reloading the cameras. In the position where the single lens of the standard camera is normally located are two lenses, side by side, resembling two "eyes." The images they see are combined and transferred to the film through a duplex lens system. A special mechanical system in the camera prevents the wide film, used for these pictures, from bulging and flapping as it travels through the mechanism. Operation of the Spoor camera is not radically different from that of the standard camera.

In "shooting" pictures with the Spoor camera, the usual lighting of a motion picture set is employed. The lens system of the camera functions under precisely the same conditions that prevail in standard camera operation today, but will produce much clearer definition.

Gives Sharp Definition

This latter is one of the outstanding features of the new camera. It will focus sharply on foreground and background simultaneously, giving none of the blurred effects noted in ordinary motion picture close-ups. In the scenic film of Niagara, objects two miles away retained a sharpness of detail rivaling the Falls in the foreground in which particles of water could be clearly discerned.

The Spoor-Berggren projection machine closely resembles the standard motion picture projector in current use, except that its mechanical systems are arranged to carry the double-width film. This requires special gearing and a compressed air control on which the wide film rides to prevent buckling or twisting. The lens system is standard optically, but larger to project the oversize picture. A special shutter arrangement is employed which differs radically from standard types.

At the demonstration, the picture was thrown on the screen from a distance of 144 feet. The length of the "throw" makes

(*Continued on next page*)

Roxy Praises Cinephor Lenses

THE following letter from Mr. Art Smith, Supervisor of Projection for Roxy Theatres Corporation, typifies the opinions of many projection experts:

"After extensive tests with both American and foreign made objective lenses we have installed your Cinephor lenses and have found them far superior to any others.

"They give us a clear field and depth of focus, and I have especially noticed that the color correction is practically perfect.

"I am writing this letter at the direction of Mr. S. L. Rothafel."

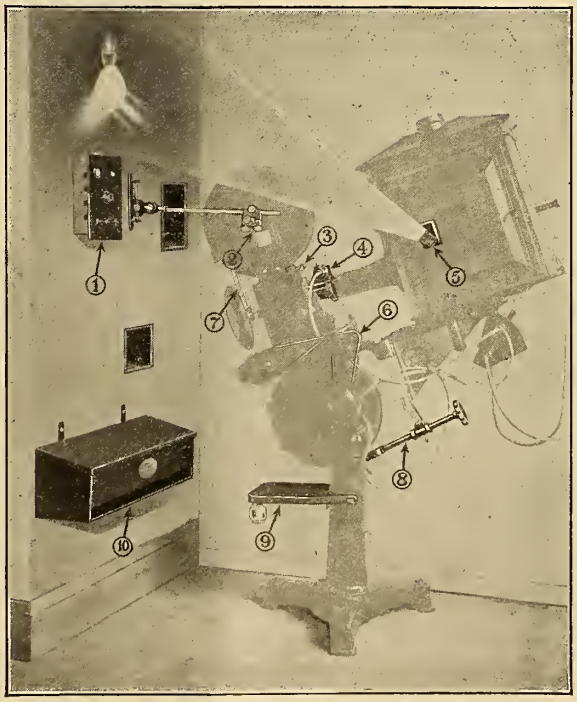
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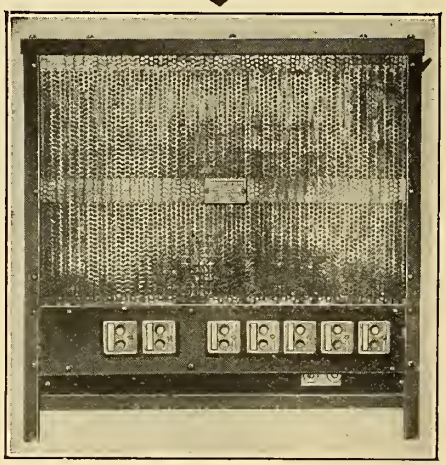
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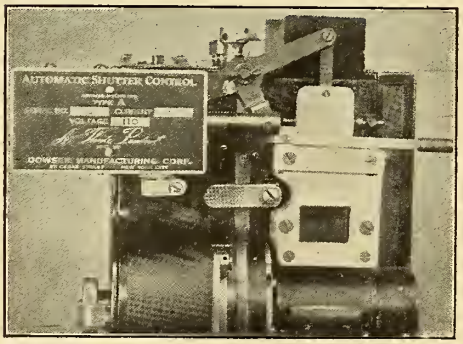
Contracting Electrical Engineers—Moving Picture Theatre Electrical Specialists

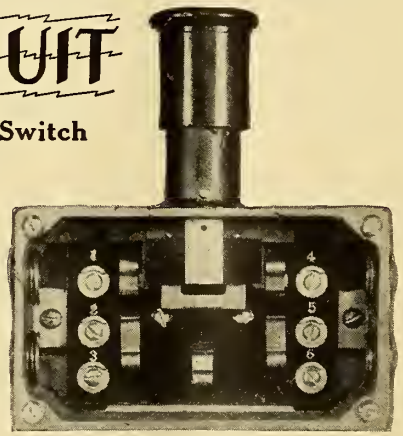
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Big Curved Screens Visioned for Films

HUGE lateral screens upon which motion pictures may be projected in three dimensions and natural colors in a cinema playhouse built in the shape of an inverted teacut and after the principle of the old Roman and Greek ampitheatres are prophesied by Lorenz del Richio, in charge of the experimental laboratory for Paramount-Famous Lasky Corp. at Astoria, L. I., N. Y.

Pure stereoscopy, or motion picture giving the illusion of depth and the proper relationship between images on the screen, can never be attained by present methods, Mr. del Riccio said, but a satisfactory illusion may be obtained by camera tricks. Such a one is a picture of an airplane flying over buildings which are out of

New Spoor-Berggren Process Shown by RCA

(Continued from preceding page)

no difference, and may be increased or decreased to fit all theatres. The only requirement in projection, aside from the projector, is a large screen, usually covering the proscenium opening of the theatre.

A Few Projection Details

The new picture system has been completely accommodated to the RCA Photophone system of sound recording and reproduction.

The entire process is the work of Mr. Berggren, including the special projector used. This projector was not exhibited, but it is understood that it has been simplified as much as possible, having only 10 gears and employing an 8 to 1 movement. A 3-blade shutter is used, with the blades so constructed as to fade each frame out and the next one in. Such a shutter design was necessary because of optical problems presented.

The condensers are made of quartz, one of the most expensive glasses, so that it may resist the terrific heat. The inventors found that ordinary glass would not do; in fact, a special heat-resisting glass imported from Germany exploded into bits after one test. Between 150 and 160 amperes is used, together with special 6-inch condensers. The lens is one of 9½ focal length.

Tribute to the Craft

What might be termed the "secret" of the process is not contained in any one step of production, each procedure of photography, printing and, finally, projection combining essentials to produce a perfect result. An error in any one of these three steps would be sufficient to destroy the effectiveness of the process. All materials used in the process are of special make and were adopted only after exhaustive tests over a period of 20 years.

A statement by Mr. Berggren in which he expresses his deep appreciation for the splendid work done by the projection crew assigned to his work appears on the title page of this article, and constitutes a splendid tribute to the craft.

focus, and another in the sharply focused close-up with a blurred background.

Depth, Sound and Color

The real three-dimensional image, which, he feels, is the next step in the progress of science with the screen, will be obtained through means other than a one-eyed camera. This, in combination with sound that will issue, not from horns behind the screen, as at present, but from a diaphragm as part of the screen surface itself, along with natural color that will be achieved by superimposing three images cast almost simultaneously from a continuous projector, will be the ideal in moving pictures of the future.

The effect of color in this instance will be attained through a process similar to the three-color process which is common in printing magazine covers, according to Mr. del Riccio. To achieve this, three times as many film frames or images will have to be taken, each tinted with a primary color.

Flat Screens to Go

A flat wall as a receptive screen for stereoscopic pictures will never be quite successful, he believes. Both sound and sight will issue from a screen which, in the future cinema house, will be mounted on the back wall of a circular theatre having no balconies to interrupt the perfect sound curve. These film theatres will not have proscenium arches, as nearly all indoor theatres now have, and will have no visible stage. For stage presentations a semi-circular stage on an elevator shaft will rise.

The screen will also change in size, Mr. del Riccio said. There is no reason why a screen should be limited within the frame of the proscenium, he believes, or why it should keep its present size or proportions. Future screens may be sixty feet wide and thirty feet high, and it will be possible to turn them, Mr. del Riccio predicts, to have vertical proportions when the illusion of great height is needed. In this way when the image of a tall building is being projected it will not be confined to a horizontal frame.

Sees Decline of Stage

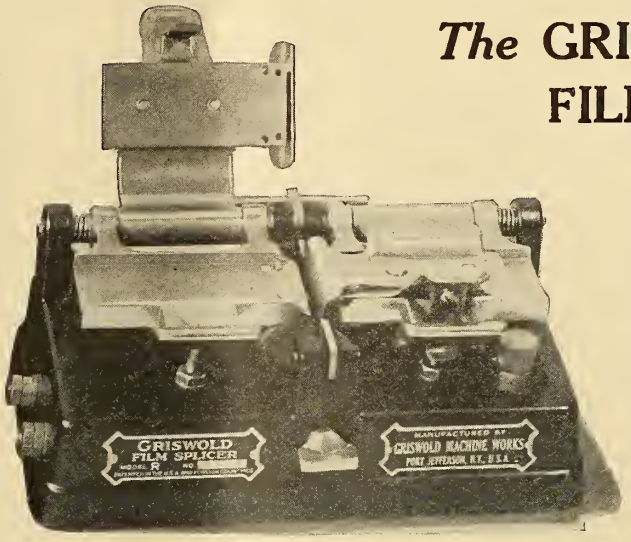
In this way also scenes of great magnitude could be enacted. War sequences in which a confusion of marching feet, roll of drums, roar of planes and other pictorial manoeuvres could all be shown without confusion.

Mr. del Riccio believes that talking films with third dimensional images in natural colors with sound will, within the next five years, supplant almost all stage productions except in a few large cities.

10,000 Installations by 1930

Production at the big Western Electric factories having speeded up considerably, it will be possible to wire 10,000 theaters by the end of 1930, according to H. M. Wilcox, operating manager for Electrical Research Products, Inc. The latter company now has more than 200 service men stationed at 26 service stations throughout the country.

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MOTION PICTURE PROJECTIONIST

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Do Motion Pictures Injure the Eyes?

By HERBERT S. MARSHUTZ

THE effect of motion pictures upon eyes has been misunderstood for years. The first impressions on the subject date back to a time when fewer people attended pictures, and to a period when motion picture projection was not at all like it is today.

At the present time several millions of people of all ages visit motion picture houses every day. Ninety per cent of them will suffer no inconvenience to their eyes. But there is nevertheless an undercurrent of belief firmly imbedded in the public mind in the United States and wherever pictures are shown, that movies hurt the eyes. Now, why is this the case?

In preparing this material, we have analyzed the conditions under which the human eye functions in a motion picture theater. Every condition that is somewhat unusual, and any circumstance under which the eye must work differently than in any other visual effort, are a hundred times less objectionable than 15 or 20 years ago. During that early period, there were many flaws both in picture making and picture showing. Today they are either greatly lessened or omitted entirely.

"Dark-Adaptation" Necessary

Now what are the unusual conditions under which the eye must function in a picture house? There are quite a few. First of all, there is a great reduction in the amount of light. Even the brightest and whitest scenes are dim in contrast with daylight illumination. And the theater is still darker. Consequently the eye is working in reduced light. Even though the eye is observing detail the pupil is larger than would be the case in an ordinary room or office. Between the screen and the corners of the auditorium is a decided contrast of lighting.

Another unusual feature in spite of the impression of flowing motion, the picture on the screen is, of course, a series of rapidly changing scenes. Then again, there is no depth—the screen is a flat surface. And the eye is seeing a world without its accustomed perspective. What one sees is not an image of any object but the image of an image. It is not in natural colors as a rule, but in monotonous tones of black and white.

Abnormal Functioning

All these point to the undeniable fact that the eye must function under abnormal conditions while viewing a photoplay. But we must not be too harsh. Most eyes should have no difficulty. The old viewpoint that motion pictures are bad for the eyes is based on conditions of many years ago. At the present time, the abnormal conditions present in the showing of a photoplay are for the most part present in the legitimate theater, at the lantern lecture, at the opera and even in some of our badly illuminated homes and offices. Except for the motion and the quick changes of shading on the

(*Continued on page* 36)

Lumitone Lighting

(*Continued from page 23*)

reverse and can be pre-set to stop the dimmer at any desired fraction of the entire movement. For vaudeville and special effects an automatic roll can be turned on by touching a button. In case of an emergency the switchboard can be operated by hand as the new control installation does not interfere with hand operation.

For the lighting of lobby, foyer and auditorium, automatic rolls, designed by the corporation's engineers, are used. The lighting circuits of the dome, foyer, etc.,

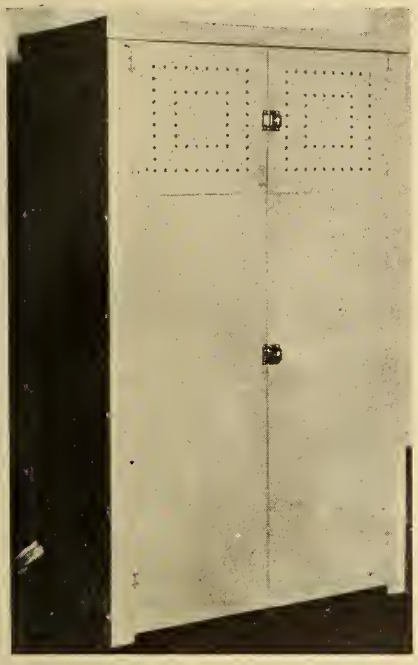


Fig. 2—Equipment completely enclosed

are led through the control cabinet and the roll, reversing itself automatically, repeats and performs endlessly. These rolls close switches and move dimmers to fractional degrees.

The Lumitone is made with a control capacity of from 4840 to 13200 watts. It is now being manufactured in standard models to care for four to eight circuits, though any number of circuits may be controlled through special installations. The controls, as shown in the accompanying illustrations, are housed in steel cabinets.

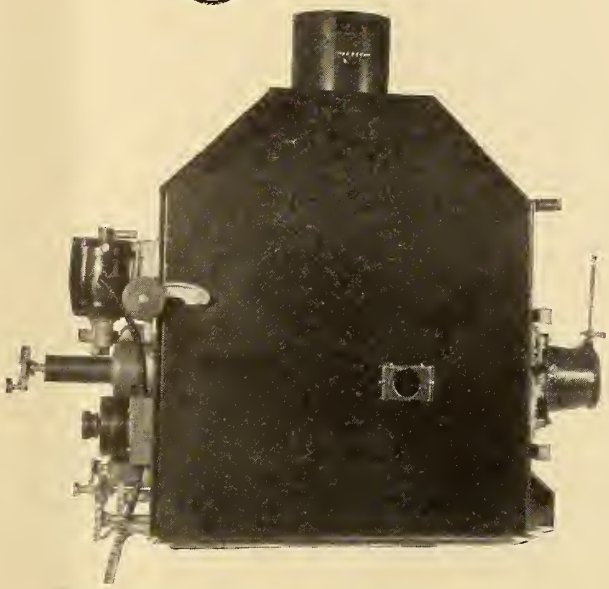
The remote or manual controls are available as additional equipment. With these manuals, various effects are controlled by "stop keys," similar to those of an organ. Automatic control is cut out or restored by a touch on buttons on the console. The console is used with a four circuit control. Each circuit is controlled by four stop keys: "Current On," "Current Off," "Dimmer Up," "Dimmer Down." A touch on the "On" key switches on the current. The "Dimmer Up" key is then held down until the desired intensity of light shows.

The operator's hand brings up the light intensity on one circuit with his "Dimmer Up" key. To diminish, the "Dimmer Down" key is held, and when the circuit has been used, the "Off" key is touched. Spot circuits are not dimmer controls and are simply "On" and "Off." The 4-circuit manual provides for two spotlights. Dimmers can be moved in any position when necessary and they can also be moved before the light and left there. They can also be moved before the light is turned on, giving an entrance of any color at a predetermined intensity. For "blackout" effects, the light can be turned out at once without regard to the position of the dimmer.

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Effects of Voltage Variation and Frequency on Performance of Induction Motors

INDUCTION motors are at times operated on circuits of different voltage or frequency from that for which the motors are rated. Under such conditions, the performance of the motor will vary from the standard rating. The following is a brief statement of some operating results caused by small variations of voltage and frequency, and is indicative of the general character of changes produced by such variations in operating conditions.

Power and Efficiency

Voltage variations of 10 per cent on power circuits are allowed in most cases. However, changing the voltage applied to an induction motor has the effect of changing its proper rating as far as power factor and efficiency are concerned, in proportion to the square of the applied voltage. Thus a 5 H. P. motor, operated at 10 per cent above the rated voltage, would have characteristics proper for a 6 H. P. motor (6.05 H. P. to be exact); and at 10 per cent below the rated voltage, those of a 4 H. P. motor (more exactly 4.05 H. P.). It is of course obvious that if the rating of a motor were greatly increased in this way, the safe heating would frequently be exceeded.

In a motor of normal characteristics, at full rated horsepower load, a 10 per cent increase of voltage above that given on the name plate would usually result in a slight improvement in efficiency and a decided lowering in power factor. A 10 per cent decrease of voltage below that given on the name plate would usually give a slight decrease of efficiency and an increase in power factor.

The starting and pull-out torque will be proportional to the square of the voltage applied. With a 10 per cent increase or decrease in voltage from that given on the name plate, the heating at rated horsepower load will not exceed safe limits when operating in ambient* temperatures of 40 deg. C. or less, although the usual guaranteed rise may be expected.

An increase of 10 per cent in voltage will result in a decrease of slip of about 17 per cent. while a reduction of 10 per cent will increase the slip about 21 per cent. Thus if the slip at rated voltage were 5 per cent, it would be increased to 6.05 per cent, if the voltage were reduced 10 per cent.

Frequency Regulation

Higher than rated frequency usually improves the power factor, but decreases starting torque, and increases the speed, friction and windage. At lower than rated frequency, the speed is, of course, decreased; starting torque is increased; and power factor slightly decreased. For certain kinds of motor load, such as in textile mills, close frequency regulation is essential.

If variations in both voltage and frequency occur simultaneously, the effects will be superimposed. Thus if the voltage be high and the frequency low, the starting torque will be very greatly increased, but the power factor will be decreased and the temperature rise increased with normal load.

The above facts apply particularly to general purpose motors. They may not always be true in connection with special motors, built for a particular purpose, or as applied to very small motors.

* Ambient temperature is the temperature of the air or water which, coming into contact with the heated parts of a machine, carries off their heat.

Do Motion Pictures Injure the Eyes?

(*Continued from page* 34)

screen, motion pictures and the theaters have much in common when it comes to the eyes.

How to Rest the Eyes

The average photoplay lasts almost two hours, during which time the audience usually has the opportunity to rest the eyes by listening to music or viewing a vaudeville act. Such rest periods are very valuable and by all means should be taken advantage of. Trying to read programs in the usually dim light between acts is just as apt to bring on visual fatigue as watching the picture too steadily, even for a period of several hours.

For years I have made a practice of looking around the theater, studying the decorative effects, noting the ornamentations—anything to get the eyes on different light and at different angles. This has proven very restful. Nothing will tire eyes more than looking too steadily at one point or at one kind of object. Even gazing for just a minute at one color, one letter, produces what we know as retinal fatigue. This is involved in most discomforts experienced from prolonged use of the eyes at theaters, or any steady observation at any distance near or far. More data on this important phase of motion pictures would be welcome.

Improved Conditions

Since the nickelodeon of long ago, so much improvement has been made in the showing of pictures that no one who has investigated the subject today can come to the conclusion that the movies harm the eyes in any way. *I believe that if pictures bother the eyes, it's the eyes, not the pictures.* Those persons who sit very far

(*Continued on next page*)

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Do Motion Pictures Injure the Eyes?

(*Continued from preceding page*)

down front are apt to feel quite some eye-strain—due to the increased brilliancy of the screen at this point, the undesirable angle at which the head must be held, and the close position itself. If movies do give you uncomfortable eye sensations, by no means sit closer than half-way down. It is beter to wait for a good seat than to take a bad one. If you can't see clearly or comfortably three-fourths of the way back, it is quite likely that it is not the picture at all and your eyes should be examined.

Where Fault Lies

Today the owners of picture theaters are doing a great deal to make the eyes of their audiences more comfortable. To begin with, better films are being made—better and more gentle lighting effects, less harsh contrasts, fewer glaring white surfaces. Then theaters are not the terrible black holes they used to be. Faint house-lights are on continually—the theater is partly illuminated. There are special acts in various colors. We have "non-flickering" projection, and film without flaws and scratches. All these are factors that have led investigators to the same conclusion. And this is the conclusion—*if the movies hurt your eyes, nine chances out of ten, it's your eyes, not the movies.*

Those eyes which never have rest except when in sleep, are the eyes that suffer from any unusual work. Possibly a long day's drive, possibly even reading or other close application of the eyes, possibly the theater or a picture show bring discomfort or headaches—such eyes are doing more than their normal work. For them, unfortunately, the act of seeing distant objects is labor—a steady task—instead of relaxation, unless the owner of such eyes is wise enough to get optometric relief through glasses.

Pictures Not at Fault

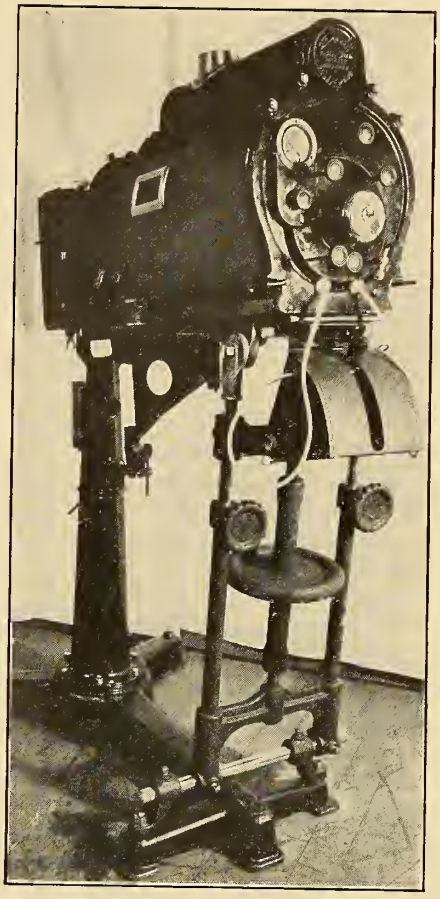
We are glad to note that in accordance with our own views on the subject, such organizations as the Eyesight Council of America, the British Committee on Eye-strain in Cinemas, The New York City Department of Health, Optometrists and Ophthalmologists, illuminating engineers and optical scientists throughout the world are agreed that even though present-day picture theaters cause the eye to function under unusual conditions, such conditions are seldom at fault if the eyes cannot view a half-dozen reels of film without inconvenience or bad after effect.

The concentration necessary in the comparatively dim light is the underlying cause of discomfort in motion picture houses. But such concentration should not affect a normal pair of eyes to any considerable extent nor should it affect eyes that are functioning normally with the aid of glasses.

New Cameramen's Scale

A new scale of wages for cameramen became effective on May 20th, in accordance with a contract signed recently by producing organizations with Local Union 659, cameramen unit of the International Alliance.

Free-lance cameramen will work eight hours daily, with time and a half for overtime and double time for Sundays and holidays. They will be paid $50 daily. Contract cameramen will work a maximum of 60 hours weekly at $250 per week.



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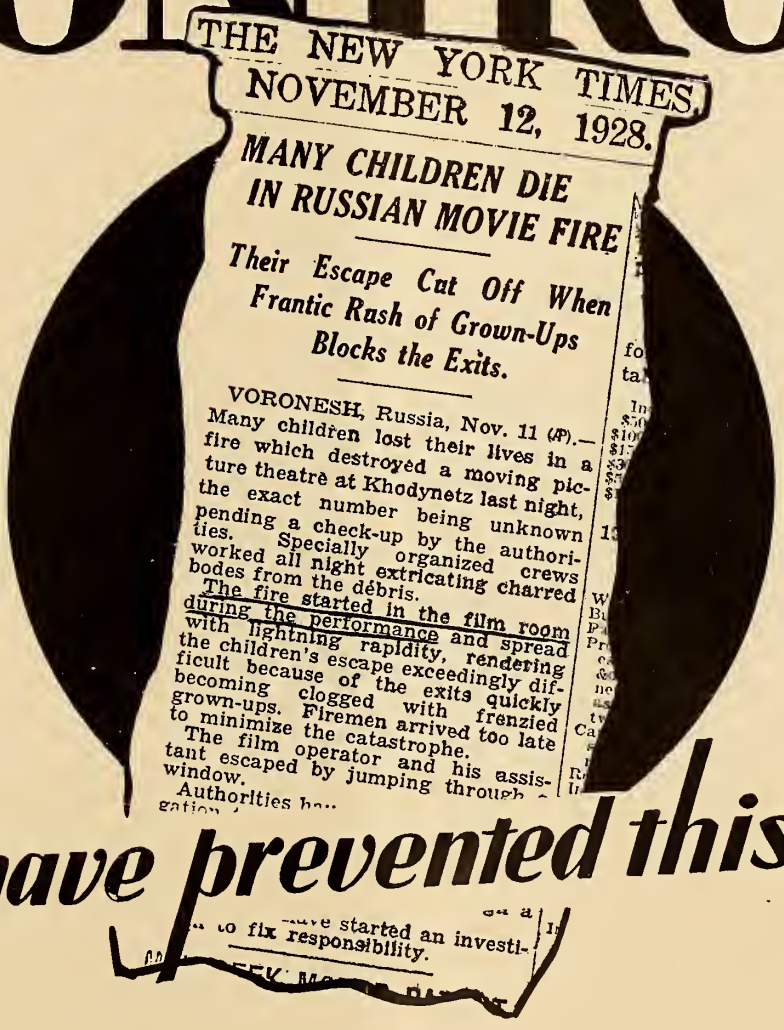
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Answers on W. E. Apparatus

(Questions appear on page 8)

1. To reproduce speech or music in connection with a motion picture in a realistic manner.
2. Disc and film methods.
3. To generate a small electric current whose variations correspond to the sound waves forming the particular sound that was recorded.
4. From an electrical reproducer playing on a disc record.
5. It is similar to a phonograph recorder but much larger.
6. At about half the standard speed of a phonograph record.
7. For one reel of film.
8. No, except that the starting point for the disc is indicated.
9. A narrow, bright beam of light from a high intensity exciting lamp is focused on the sound track of the film through a system of lenses and an aperture plate. The light passing through the film will vary in intensity according to the difference of the lines on the sound track. This light falls on a photo-electric cell, which produces a small electric current whose variations correspond to the light and therefore to the recorded sound.
10. Below projector lower sprocket.
11. It is of standard size. The sound record is a band of microscopic lines about ⅛" wide running down one side of film.
12. The current is passed along to one or more vacuum tubes. These tubes greatly amplify the current.
13. By means of receivers and horns located at the screen.
14. One with a fair reflective efficiency which permits the sound from the horns to pass through.
15. By having the projector and the turntable, carrying the record, driven by the same motor.
16. As the sound record and the picture are on the same film synchronism is assured if set up with the proper loops.
17. At 90 feet per minute.
18. By use of a special type of motor and an electrical governing system.
19. Three sets.
20. "H" and "F¹" and "F²" batteries.
21. To supply magnetizing current to the receivers attached to the horns.
22. To supply filament current to the amplifiers, exciting lamps, etc.
23. One set must always be on charge while the other is being used.
24. This depends upon the extent to which the equipment is used.
25. By using the hydrometer.
26. The specific gravity of acid in the battery. This is called battery gravity.
27. Every day.
28. Select one cell in each battery group for use as a pilot cell. Remove filling cap and draw enough acid into hydrometer to lift float. Replace all acid and replace cap. Never measure immediately after adding water. Wait until the battery has been charging long enough to stir up the solution.
29. On battery log-sheet.
30. As soon as the pilot cell of any set falls below 1200. Never allow the gravity to fall below 1190. Never start charging above 1200.
31. When gravity has risen to between 1270 and 1285.
32. So that one set of "F" batteries will reach full charge while the set in use is down to 1200. If the period of charging takes longer than the period of operation, notify the service engineer.
33. Yes.
34. Every month.
35. So that each cell will be used in turn and loss of electrolyte equalized.
36. (a) Set at "operate" the switch of the "F" battery set to be used. (b) Set at "charge" the switch of the "F" battery to be charged. (c) Set at "operate" the switch of the "H" batteries.
37. Open both "F" and "H" switches. If batteries of "F" or "H" sets are not up to charge, set switch at charge and leave until full gravity is reached.
38. Distilled water only.
39. No.
40. Every week on pilot cells and every two weeks on others.
41. The acid level should be about ¼" above the top of plates. Never allow it to get down to top of plates or touch the bottom end of filling tube.
42. By running it in slowly before charging. Batteries need more water in hot than in cold weather.
43. Drug stores or automobile and battery service stations.
44. At least once a week.
45. With a rag moistened in a solution of baking soda or ammonia and water in equal parts.
46. No, except when testing gravity or adding water.
47. Keep fully charged, test gravity and add water once a month. Keep connections tight at all times.
48. Well ventilated and dry. Never bring open flames or light into battery room.
49. One. He should have full responsibility and entries in log sheet supplied.
50. Adjust the light from the exciting lamp so that a bright, clear illumination is obtained on the photoelectric cell. This should be done every day.
51. Vibration from the projector may cause the lamp to change its position. Another cause may be that dirt or dust has collected on lamp, lenses, aperture plate, tension pad or film.
52. Close the film pick-up switch on the front wall of the projection room.
53. Put lamp in socket and light it by turning the control on door of compartment until the meter reads 3.6 amperes.
54. Make necessary adjustments so that lamp is centered and focused properly.
55. Turn control on film amplifier until meter pointer is at middle of red mark.
56. When filament begins to sag or bulb begins to blacken.

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THE NEW YORK TIMES,
NOVEMBER 12, 1928.

MANY CHILDREN DIE IN RUSSIAN MOVIE FIRE

Their Escape Cut Off When Frantic Rush of Grown-Ups Blocks the Exits.

VORONESH, Russia, Nov. 11 (AP).—Many children lost their lives in a fire which destroyed a moving picture theatre at Khodynetz last night, the exact number being unknown pending a check-up by the authorities. Specially organized crews worked all night extricating charred bodes from the débris.

The fire started in the film room during the performance and spread with lightning rapidity, rendering the children's escape exceedingly difficult because of the exits quickly becoming clogged with frenzied grown-ups. Firemen arrived too late to minimize the catastrophe.

The film operator and his assistant escaped by jumping through a window.

Authorities have started an investigation to fix responsibility.

would have prevented this tragedy

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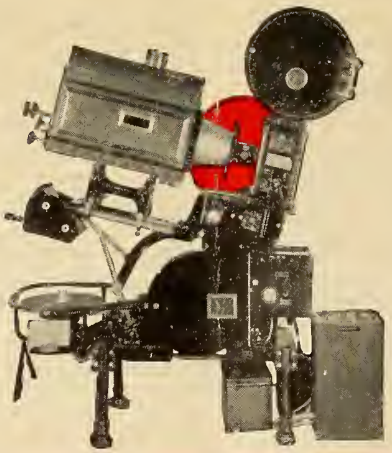
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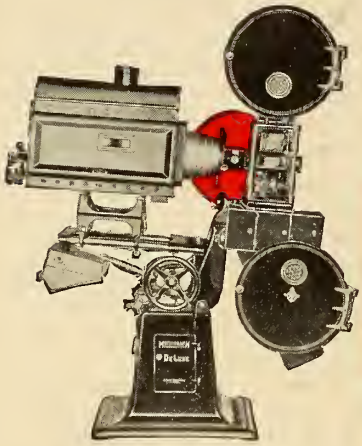
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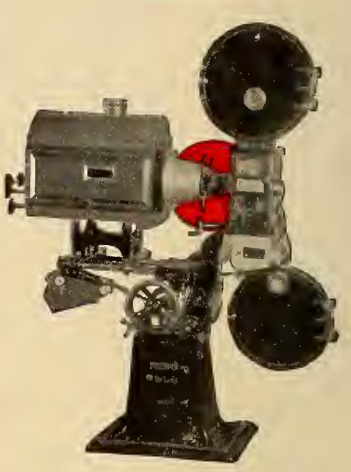
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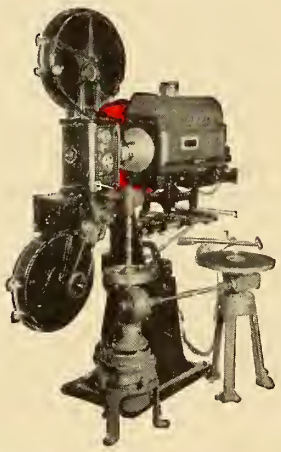


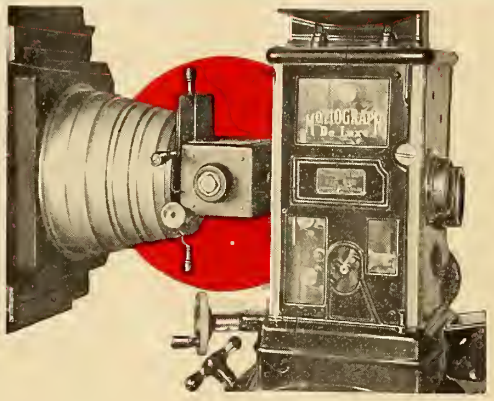
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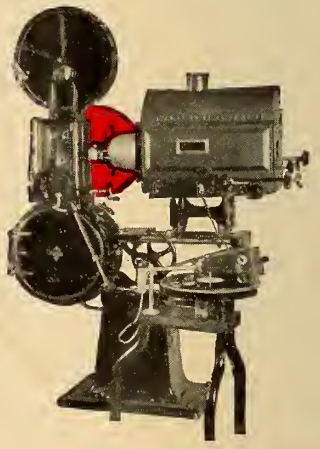
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Comparative Projection Room Costs

JULY, 1929
Vol. 2 No. 10

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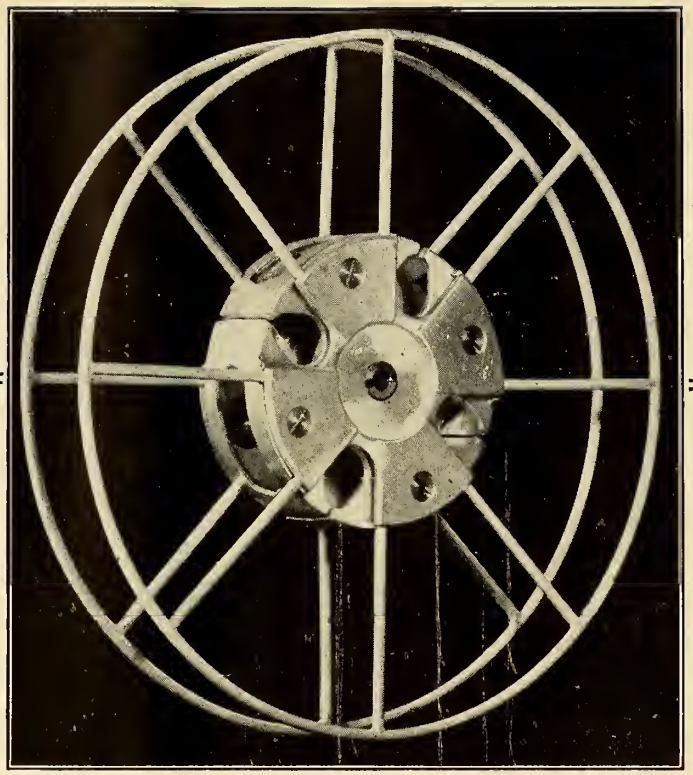
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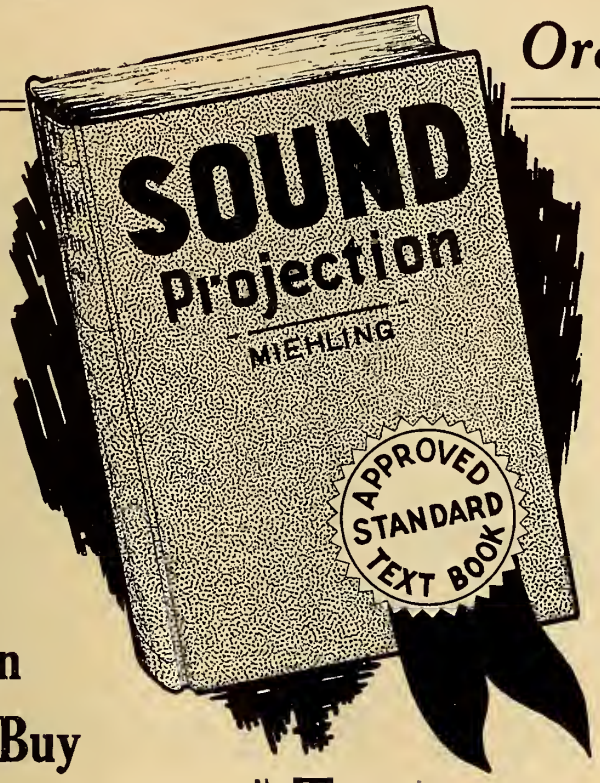
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Mr. Miehling, the author, is himself a practicing projectionist, a graduate technical engineer, and the designer of a popular sound device now in use in many theatres throughout the country. Due to his technical knowledge on the one hand and his familiarity with the projectionist and projection on the other, he is at present the best equipped person to have prepared this book.

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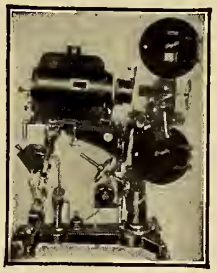
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Depth, Color and Sound on One Exposure Promised

REVOLUTIONARY methods of colored photography, sound pictures and third dimension are promised in an invention being developed by Watson Hartley, Boston inventor, who has submitted his ideas to tests performed at the Paramount Long Island studio. It is expected that a demonstration of this new process will be given shortly in which all three elements will be combined on one film.

Hartley promises to correct the defects encountered in color photography by producing pictures in color without the use of color on the film; to produce third dimension on the screen also in color and to correct angular distortions caused by the fact that all parts of the screen are not the same distance from the projector. Sound will be added to the film by the sound-on-film method during shooting of the color scenes, it is claimed.

Camera Analyzer

In taking colored pictures Hartley will use the regular camera in the ordinary way but affixed in front of the lens will be a revolving filter of light carrying a series of colored glass segments in such a way as to build up the color waves into the negative. The basic colors of red, yellow and blue are used covering the whole range of the spectrum. The negative, it is claimed, in this method gets imprints of the various wave lengths that represent the colors and the tints of the object photographed and it transmits these color wave lengths to the print or positive taken from it.

Curved Screen

On the same film, sound of the object photographed is registered. Thrown upon the regular white screen the picture taken with the filters would not register for the reason, it is claimed, that the screen lacks the properties of proper absorption and reflection. As a result a special curved screen has been constructed by the inventor which consists of four screens instead of one. The first screen has large perforations, like a net, so as to let 75 per cent of the light from the projector penetrate. The second screen, an inch or so in back of the first has a smaller net effect, while the third screen has a still smaller mesh.

Each screen is painted according to the filter attached in front of the lens, that is, one is red, another yellow and the third blue with the fourth screen being azure blue to represent daylight.

Overcomes Color Deficiency

All artificial light has a yellow tinge, says the inventor, and one of the important features of his screen is that the neutralizing of the yellow tinge is accomplished by coloring the fourth screen a pale sky-blue. Thus, when the yellow tinge light from the projector is thrown upon this screen the sky-blue portion of the screen provides the blue-ray deficiency, with the result that all the light areas of the picture appear in a soft natural light, equivalent to daylight.

On this same screen the figures stand out in bold relief. They have depth as well as width, for there is depth to the quadruple screen, and the production of third dimension pictures thus is accomplished, the inventor claims.

With this invention, it is asserted, the negative will carry from the first exposure the image, the colors and the speech in such form that they all can be reproduced on the new type of screen. Instead of impeding sound transmission, this quadruple screen, claims the inventor, will facilitate the speech and the music in sound pictures.

New Mellaphone Speedometer

The Mellaphone Corp. of Rochester, N. Y., makers of the Mellaphone sound picture apparatus, is now offering a speedometer for motion picture projection work.

This new speedometer is guaranteed as to workmanship, durability and accuracy and is warranted to give complete satisfaction. The price of this new speedometer is $20 complete.

Mellaphone is ready to make immediate quantity deliveries of the speedometer.



William Haines in "The Smart Set." Courtesy of Metro-Goldwyn-Mayer

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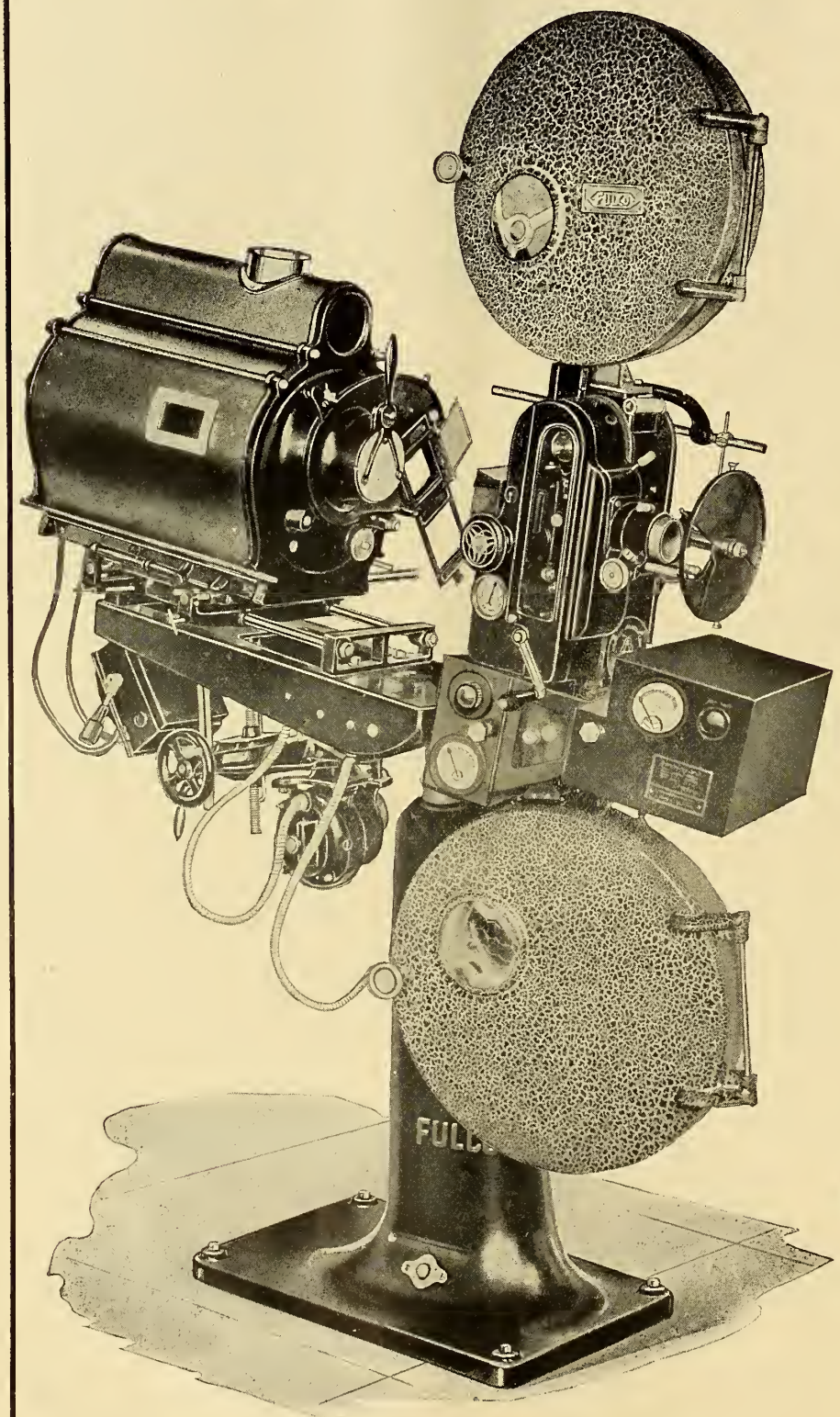
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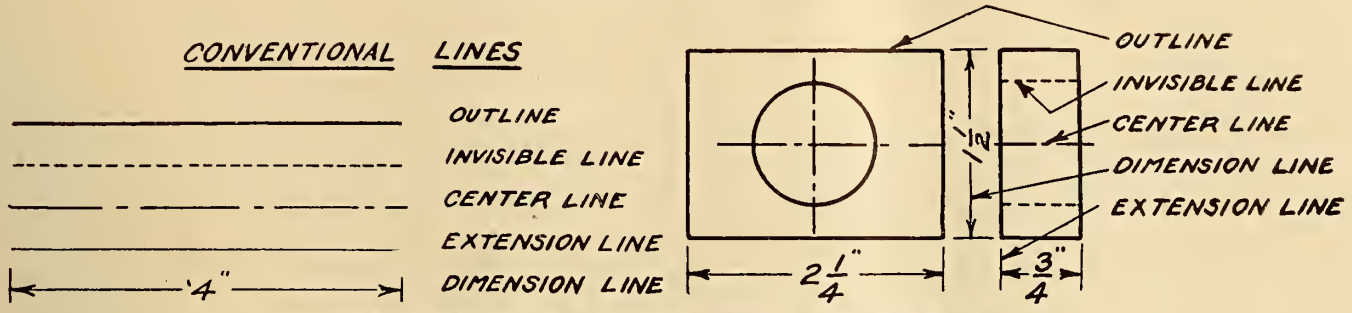


Fig. 1—Standard conventional lines used in mechanical drawing

Blueprint Reading*

By W. W. STURTEVANT

MECHANICAL drawing is the accepted language of industry, and a knowledge of this language is a requirement for success in many lines of work. Contrary to an altogether too general belief, learning to read a drawing is not especially difficult, as there are certain fundamental rules or principles underlying the language of drawing, the same as there are underlying any other language. Drawing has its rules of grammar, its idioms or slang expressions, and its conventions.

Having once acquired a knowledge of the rules and the usual ways of expressing ideas, all that is necessary is the spending of enough time in drill or practice to develop case and speed in reading the message told by the lines and figures. While many workmen take courses in mechanical drawing similar to those offered to men who are preparing themselves for employment in the drafting room, it is not necessary to learn to draw in order to read a drawing.

The study of how to make drawings and the making of them will teach one to read drawings, but much time is wasted in laying out the drawing and developing skill in handling drawing instruments that are not used by the mechanic in the shop.

What the mechanic should have is the ability to read the shape and size of the object from the print. He should be able mentally to picture the object. Also, he should understand the rules of drawing well enough to make a readable freehand sketch that will convey his ideas to others.

A mechanical drawing differs from a picture in that it shows an object as it is and not as it appears to the eye of an observer from one position. The mechanical drawing is a combination of views arranged according to a definite plan, one showing the object as it appears from the front, one showing the object as it appears from the top, and one showing it as it appears from the end or side.

Number of Views

The three-principle view is illustrated by placing an object in a glass box and drawing the different views as they would appear on the front, top, and end of the box.

A drawing should show completely the size and shape of the object drawn. The number of views required to give this information varies. An object of uniform thickness may be shown by one view with a note stating the thickness. One view of a sphere is sufficient, for added views would all look alike. Cylindrical objects may be shown by one view and the abbreviation *D.* or *dia.* or *diam.* after the dimension to indicate they are cylindrical in form.

On the other hand, complicated castings may require many more than the usual three views—often eight or ten are necessary. No matter how many views are used in the mechanical drawing, the correct relation must be maintained.

A drawing should show the views of the piece that give the clearest idea to the reader. Solid lines showing visible edges and surfaces are easier to read than dotted lines showing invisible or hidden edges and surfaces, and, other things being equal, the view using the solid lines may better be selected.

Alphabet of Lines

In order that the drawing may be easier to read, certain standard conventional lines are used. These are illustrated in Fig. 1. Figures in feet and inches in the dimension lines tell the exact size of the object. Light lines broken in the middle to admit the placing of figures show from which point the figures read. Arrowheads placed at the end of light lines make it possible to show exactly from which point the measurements are taken.

The size of all parts of the object, as well as the overall dimensions, are usually given. Several general rules governing the dimensions of a drawing should be noted.

Dimensions are usually placed between views or at the side of the views of a drawing so that the dimension lines will not obscure the drawing. Added lines on a drawing naturally lead to confusion. This rule is often violated if it is more convenient to place dimensions directly on the drawing.

Dimensions

Dimension lines are made much lighter than the lines of the drawing so that the contrast in weight of the lines will prevent any possibility of confusing them. Figures are placed at right angles to the dimension lines. Dimensions should never be given in such a way that calculations are necessary to find sizes of parts or distances. When the mechanic is compelled to add, subtract, or divide in order to find sizes, much time is wasted, and the probability of mistakes increased.

Fig. 3 shows two of the more common ways of giving dimensions. Dimensions on pictorial drawings do not always follow the above rule.

As it would be impractical to make full-sized drawings of many large objects, some method must be found to show drawings of such objects on a small sheet. This is done by making drawings to a reduced scale. That is, the object is drawn in the true proportion but smaller than the original.

The most common scales used are half size and quarter size, although the draw-

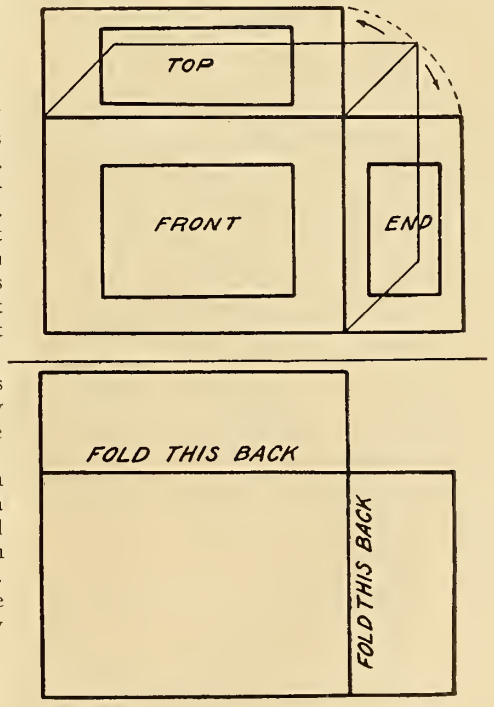


Fig. 2—Showing relation of planes to each other

*From *Blueprint Reading*, by W. W. Sturtevant. McGraw-Hill Book Co., New York City.

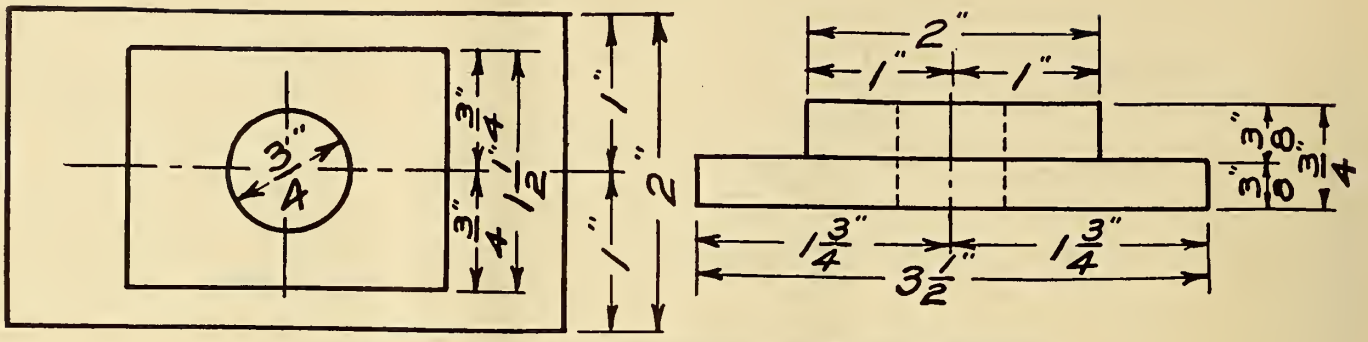


Fig. 3—Showing two of the more common ways of giving dimensions

ings may be made ⅛ size, ¾ size, or ⅜ size. They are never drawn odd sizes as ⅓ or ⅕. When drawings are made to a smaller scale, the scale is sometimes marked on the drawing as "Half Size," or "One-half scale," or "½" equals 1", or "6" equals 1'."

As the reader gets the shape of the object from the lines of the drawing and the size from the figures, he can think of it as it really is and not the size of the drawing. Drawings of very small objects made the actual size would be difficult to read and are often difficult to dimension well, and such objects are often drawn larger instead of smaller than the true size. The drawing may be marked: "Double Actual Size," or "Twice Full Size," or "2" equals 1"."

Auxiliary Views

Frequently, two scales are used on the same drawing. The object may be drawn actual size or full size and some small part or section of it drawn double the actual size to make it clearer. Again, the main drawing may be made to a small scale and a part drawn the full size. In any case, when reading a drawing think sizes in terms of the figures given, not in the size of the drawing.

Sometimes a drawing must be made of an object that is of such a shape that it cannot be clearly shown by the usual views and it is necessary to use an auxiliary or assisting view. Certain things that appear frequently on drawings are often drawn conventionally instead of as they actually appear in order to save the draftsman's time. These short cuts have been used for many years and have become standardized to a great extent by custom. The most common, shown in Fig. 4, are the conventions used to indicate the curves of gear teeth.

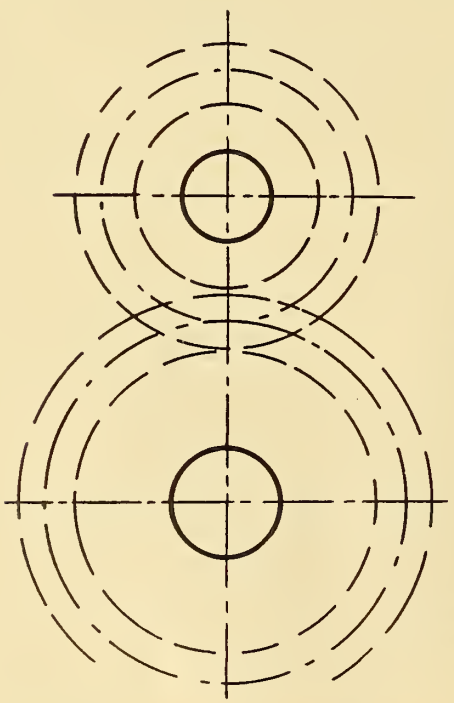


Fig. 4—Conventional indication of curves of gear teeth

Note—The foregoing material was abstracted from "Blueprint Reading," by W. W. Sturtevant, published by McGraw-Hill Book Co., New York City.

Radio Pictures to Use Spoor Process at Once

RADIO PICTURES has appropriated a million dollars to make several of its forthcoming productions by the RCA Spoor process of "natural vision" photography and projection, according to an announcement by Joseph I. Schnitzer, president. This process was described in the June issue of THE MOTION PICTURE PROJECTIONIST.

Whether portions of "Rio Rita," forthcoming Radio special in talking, singing and color, to be done with the Spoor process or it is to be applied to later productions depends on the decision of the production heads in Hollywood whose job it is to figure out just how quickly innovations may be applied on the schedule.

Musicals Demand Big Film

The swiftness with which Radio has gone into the Spoor process is due, in a large measure, to the fact that it has a number of big musical productions under way, among these, in addition to "Rio Rita," being "Hit the Reck," Rudy Valee in "The Vagabond Lover," "Radio Revels," "High River" and "Night Parade." The Spoor process would enable Radio to "shoot" these big shows in their natural perspective, showing complete choruses, the full width of a fifty-two-foot screen or even larger, and fully thirty feet high, with all the action of a stage production as naturally as it is seen in three dimensions behind the footlights.

Radio Pictures are making plans to obtain a proper distribution of productions which they are prepared to make by the Spoor process, as screens of enlarged size can readily be introduced into theatres in which they have access.

Broadway Fall Showing

They have already leased the Earl Carroll Theatre on Broadway for the presentation of their first road-show production, "Rio Rita," in the Fall, and this is regarded as the opening move in a campaign of theatre-acquisition whereby their important product and pictures filmed by the Spoor process or on the narrow film may be adequately presented.

Test Color Television at Bell Laboratories

COLOR television—another step of that infant of science—was demonstrated in New York recently at the Bell Telephone laboratories, which devised the apparatus for the American Telephone and Telegraph Company. The apparatus, except for the addition of special color mechanics, was the same as that demonstrated three years ago in a wire and radio test between New York and Washington.

For the experiment the receiving and recording apparatus was set up in the auditorium of the Bell laboratories, but the system is subject to use over long distance wire or radio circuits.

Electric Eyes Transmit Colors

The difference between the color television apparatus and the regular television machine is merely the addition of three electric eyes, each transmitting a current corresponding to the amount of the natural color in the subject.

Before the three electric eyes in one end of the auditorium, a young woman stood holding various objects such as a glass of water, a colored ball and a pineapple. The current was turned on.

In the darkened receiving chamber at the other end of the hall her image, in the natural colors, was reproduced.

Three wires connected the machine, picking up the image and the receiving apparatus, each carrying its own color-current. Bell experts said that where radio was the transmitting medium three wave lengths would be used.

I. A. Mid-Summer Meet

The week commencing July 29th has been set aside by International President William F. Canavan for the mid-summer meeting of the General Executive Board of the I. A. T. S. E., which will convene at the General Office, 1440 Broadway, New York City.

Proven Facts!

ROYAL Sound Equipment, installed in leading theatres throughout the country, has earned for itself a reputation for which it is justly proud. To the exhibitor and the projectionist who today are undecided which equipment to install, Royal presents the following facts—facts that have been proven by Royal's performance in the field—

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Built with the finest mechanical precision, simple in design and operation, sturdy in structure, specially filtered to absorb all possible vibration, Royal Disc Equipment offers the utmost in perfect reproduction.

Sound on Film

Now being delivered—a radical new principle, using less moving parts than any other apparatus, with many special features, easily installed with no changes necessary in the projector—a worthy companion to the already famous disc equipment.

Amplification

The heart of any sound equipment, built entirely under Royal's own supervision, giving ample volume without distortion—producing both high and low frequencies with perfect accuracy; the Royal amplification system stands supreme in its field.



TAKE THIS UP WITH YOUR MANAGER TODAY

To June 11th Royal had equipped over two hundred theatres throughout the country. These equipments were sold entirely on their merit—word of mouth advertising from satisfied customers being the only advertising medium used.

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Amplifier Fundamentals

By ENGINEERING DEPT., ELECTRICAL RESEARCH PRODUCTS, INC.

The accompanying detailed descriptive matter and illustrations were prepared especially for THE MOTION PICTURE PROJECTIONIST as a result of many requests for such information. While "Amplifier Fundamentals" treats specifically the Western Electric 43-A amplifier, the explanation given may be profitably applied to all amplifiers.

WE will first review in a general way the fundamental theory of the vacuum tube, since this may be considered as the heart of the amplifier. Since the eighteenth century it has been known that the air immediately surrounding a heated solid possessed a higher degree of conductivity than air at ordinary temperatures. In 1853 the physicist Becquerel found that if he heated two platinum electrodes to redness, a current passed between them that could be measured by a galvanometer.

In more recent times, Thomas A. Edison learned by placing a second electrode in one of his carbon filament light bulbs that a flow of current was obtained between the carbon filament and the second, or auxiliary electrode when the former was heated to incandescence. This is known as the "Edison Effect." However, it remained for Preece and Fleming, working independently, to interpret the "Edison Effect." Fleming found that he could apply this "effect" in the Fleming valve, a piece of apparatus used for converting alternating current to direct current.

For an explanation of the above phenomena it will be necessary to review briefly the structure of matter. Scientists have assumed that the basic unit of matter is the atom, and that each atom in turn is composed of a group of negatively charged bodies known as electrons that are in constant vibratory motion around a positively charged body called the nucleus.

By applying this reasoning to a conductor—such as a piece of copper wire, a carbon or a tungsten filament—it is found that they are made of very large numbers of atoms closely packed, and that each atom has a positive nucleus around which the negative electrons are moving in all directions. If heat is applied to such a system it is logical to assume that the motion of the electrons would be increased. and as the temperature rises there would be a continued increase in electronic motion until a number of electrons would be forced from the surface of the conductor into the space immediately surrounding it in sufficient quantity to establish an electric field.

A Typical Circuit

This action explains Becquerel's experiments with the heated platinum electrodes, the "Edison effect," and the Fleming valve; and serves as an introduction to the principle made use of in the vacuum tube.

Let us assume that the conditions described in the preceding paragraphs exist in an evacuated tube into which, besides the filament, there has been introduced a second electrode in the form of a metallic plate. If the tungsten filament, which in the future will be called "the filament," is connected with a storage battery (the "A battery"); and the metallic plate, which hereafter will be called "the plate," is connected with a second storage battery (the "B battery"), a circuit for a two-electrode vacuum tube will be obtained.

With the "A" circuit closed, the filament becomes hot and begins to glow. As previously explained, this causes numbers of electrons to leave the surface of the filament, to charge the space immediately surrounding it with negative electricity.

If a positive potential is now placed on the plate, the electrons are at once attracted to this electrode, for each electron, it will be remembered, is negatively charged, and in fact can be thought of as a particle of negative electricity. As fast as electrons are attracted to the plate, others will leave the filament, and therefore there will be a steady stream of electrons flowing from the filament to the plate.

An electric current, however, is nothing more nor less than a stream of electrons, whether flowing in a conductor or through space, and hence we now have a current passing between the filament and the plate, and through the rest of the circuit, comprising the "B" battery. The convention according to which polarity has always been assigned happens to be such that the positive pole is assumed to be that from which the current flows, and we therefore say that current passes from plate to filament.

If the plate is made negative and the filament positive by reversing the battery connections, there will be no flow of current in the circuit, since the plate naturally can only repel the electrons, both being of like polarity.

This principle of the unidirectional flow of electrons, was employed by Fleming in his valve for the conversion of alternating current to direct, and is also the principle that applies to the vacuum tube when it functions as a rectifier.

Rectifying Action of Vacuum Tubes

If an alternating voltage is impressed on the filament circuit of a vacuum tube, and simultaneously an alternating potential is placed on its plate, a flow of rectified current will be obtained in half cycles when the plate is positive, but not when it is negative. This is due to the fact that the electron stream cannot reverse itself and flow from plate to filament.

If a second tube is now operated in parallel with the first, so as to have its plate connected to the same side of the A. C. line as the filament of the first tube, and its filament on the same side as the plate of the first, a full wave rectifier will be obtained, for one plate will not be positive on one half cycle and the other plate positive on the other half cycle. The rectifying tubes in the amplifier which will be discussed later, employ this latter arrangement.

Three-Electrode Vacuum Tube

The three-electrode tube has a third electrode known as the *grid,* which is a ladder-like structure that is usually mounted between the filament and the plate. The "A" and "B" batteries are connected as in a two-electrode tube circuit, and a third battery—the "C" battery—supplies a voltage to the grid.

If the "C" battery is connected so as to make the grid positive, there is a greater attraction of electrons from the filament than before, and since the grid is an open structure the greater part or these electrons pass to the plate. On the other hand if the grid is made negative, the electrons from the filament will be repelled, thus causing fewer to reach the plate.

The grid, therefore, affords a means of controlling the electron flow to the plate; and, in fact, any fluctuations in the grid voltage (such, for example, as those representing sound picked up by a microphone, or those generated by a reproducing device) will be faithfully followed by the plate current, within reasonable limits. Since the grid is always kept negative in amplifier practice, it can draw no current, and therefore the only power absorbed by the amplifier input is the very small amount needed to magnetize the input transformer or that taken by an input resistance.

Push-Pull Amplification

On the other hand, the plate or output circuit may have impressed on it a relatively large amount of power; hence, we are able to use the three-electrode vacuum tube like a valve, so that relatively little power in the input circuit controls a far greater amount in the output circuit. When a voice current enters the input, a greatly magnified or amplified copy of it is available at the output—hence the name "amplifier."

This principle makes use of two tubes in such a manner as to obtain about three times the power of a single tube, rather than twice the power, as one might expect.

The amount of power obtainable from one vacuum tube is limited by the fact

that if we make the input unduly large, the output will no longer be an accurate copy, and therefore the wave-form of the output current will no longer properly represent the sound-wave that was originally picked up. This is called distortion.

However, if two tubes be connected in parallel in such a manner that the grid of one is connected to one side of the input circuit, while the grid of the second is connected to the other side of the circuit, and similarly for the plates in relation to the output circuit, then a voltage change that tends to make one grid more negative will make the other less negative. This partly neutralizes any distortion the tubes may have, and allows each to deliver more power than it would alone.

Western Electric 43-A Amplifier

WITH the foregoing preliminary discussion as a background a complete analysis of an amplifier such as is shown in the accompanying schematic diagram of the 43-A amplifier can be undertaken. The analysis will commence with the rectifying tubes, and the discussion will be conducted in such a manner as to show how the amplifier is made ready for the reception of audio frequency impulses, and thereafter the course of audio frequency impulses will be traced through the amplifier.

An alternating current of 110 volts and 60 cycles is led into the amplifying system through the filament-plate switch D-1. When the switch is placed in the "Filament" position—i. e. when contacts AB and DE are closed—current will be supplied to the filaments of the full-wave rectifying tubes, V3 and V4, and of the amplifying tubes, V1 and V2, through the stepdown transformer T3.

This transformer feeds current into the filament circuit at a voltage not greater than 10 volts and an amperage not greater than six amperes. By closing the contacts ABC and DEF, or by placing the switch in the plate position, a potential is supplied to the plates of the tubes V3 and V4 through the transformer T4, which increases the voltage to not more than 760 volts. The tubes V3 and V4 are now functioning as full-wave rectifiers and are supplying voltage to the plates of the amplifying tubes V1 and V2.

Direction of Current Flow

The direction of current flow from tubes V3 and V4 is from the plates to the filaments of these tubes, into the secondary of transformer T3, through its center tap to the retardation or choke coil, L1, and the system of condensers, C2-C10, and C11-C19. This arrangement of coil and condensers forms a filter that serves to by-pass or filter out the alternating component of the pulsating rectified current that comes from the rectifying tubes, V3 and V4, so that true direct current is obtained by smoothing out or removing the AC ripple from the current going to the amplifier tubes V1 and V2.

From this filtering apparatus the current flows into the retardation coil L2. The purpose of this coil is to prevent the amplifier current fluctuations being shunted through the rectifying circuit in case the tubes should become electrically unbalanced; in other words, it preserves the push-pull action of the circuit.

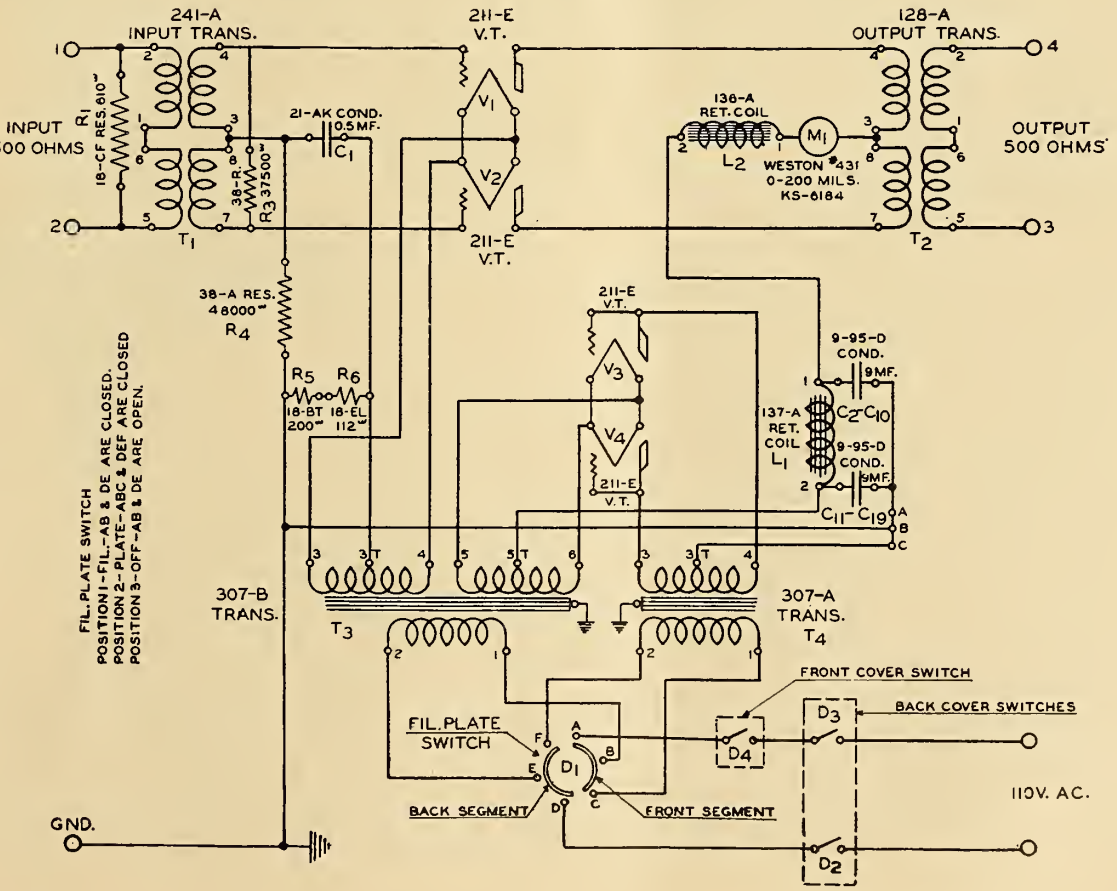
From this point the flow is through the plate current meter, M1, into the secondary of the transformer T2, and thence to the plates of the tubes, V1 and V2. The course of the current continues across the tubes V1 and V2 and out through the filaments into the secondary of the transformer, T3, and out through the center tap, across the resistances, R5 and R6, and so back to the center tap of transformer T4.

Grid Bias

Across R6 and R5 there is a drop in voltage that impresses a negative bias on the grid circuits of V1 and V2 through the secondary of the input transformer T1. This negative grid voltage still has a certain amount of ripple or unrectified alternating current component that would cause distortion in the amplifiers. To remove this, the resistance coil, R4, and the condenser C1 are used. This admits a voltage fairly free from ripple to the grid circuits of V1 and V2.

When audio frequency impulses, in the form of an alternating current, are impressed on the primary of the transformer T1, they magnetize it and cause corresponding audio frequency voltage impulses to be impressed on the grids of V1 and V2 through the secondary of the transformer. The function of the trans-

(*Continued on page 24*)



Schematic of Western Electric 43-A amplifier which, with the accompanying detailed description of the fundamentals of amplification and the fuctioning of the 43-A amplifier in particular, will serve to promote a better understanding not only Western Electric amplifiers, but all sound picture amplifiers.

The Next Year Will See A Great Change

By BOONE MANCALL

¶ *The Storm Subsides*

ALREADY there are signs tht the terrific hubbub whirling around the question of sound pictures is subsiding. Another year will see the situation well under control, with all units engaged in the production and reproduction ends operating on a thoroughly sound business basis. Twelve more months will most likely see the following developments:

The elimination of many of the sound picture devices that are now selling in almost imperceptible numbers everywhere throughout the country. These will be eliminated because they are fundamentally unsound and are built cheaply—crudely, in fact—to sell cheaply so as to catch the fancy of the harassed exhibitor and thus capitalize on the first hectic days and months of excitement about sound. Many of these cheap devices not only fail to render satisfactory service when in the projection room but do not have the benefit of speedy, complete service in case of a breakdown. We could name a score or more of such devices. They operate under all sorts of fancy names, and one is often inclined to think that they have nothing to recommend them but their contribution to sound motion picture philology.

We will see a standardizing of prices for various classes of theatres. This means that the sponsors of sound equipment will have to sell quality and service rather than price, which is what they are now doing. We will also see a great advance in the quality of equipment. The first fever is over. The basis for sound pictures is now very well understood and established. With that out of the way, the laboratories and engineers will turn their attention toward refining the apparatus already on the market rather than toward types of equipment allegedly based on new scientific principles in order to have new catch-phrases for their advertising.

¶ *The Industry's New Dress*

WE will see many new faces in the industry—not in the merchandising end but in the research and laboratory departments. These will be serious men with a fine grounding in the modern sciences, bending their energies toward the refining process mentioned above. These men have long wanted to try their hands at this work but have been dismayed by the hectic condition of the industry up to this point.

We will see many old theatres razed and splendid new ones put up in their places. Not big theatres perhaps, nor costly ones, but theatres that will be acoustically much better, thus giving sound pictures a great impetus toward perfection. We will see better screens, more adapted for sound; better lenses, too. In fact, the entire equipment section of the industry seems gradually to be shedding its outmoded coat and donning the raiment of modern research and experimenting. Even now there is a greater spirit of cooperation between manufacturers of equipment who, while perhaps unwilling to share each other's secrets, are willing to dovetail their experiences toward the common end of perfection.

And we will see a great understanding of and greater sympathy for the projectionist.

¶ *The Projectionist's Rising Star*

THIS last is the most important. One thing the producers and distributors of pictures have learned:—and that is that the projectionist can make a picture and he can break it. They have heard Thomas Edison say it. They have heard Dr. Lee DeForest say it. No less a leader in the industry than Harry M. Warner of Warner Brothers Co. said, publicly, before a large gathering of projectionists and exhibitors in New York that the fate of his million dollar productions rested entirely with the projectionists.

But the recognition of this bred at the same time a certain antagonism. They felt undoubtedly that the heretofore despised and ignored projectionists had too much power. For the moment they forgot that the same power rested in the hands of their cameramen, their directors, their writers and others as their turn came in the progress of a story from the author to the theatre.

But this attitude is changing. The producers realize that the projectionist is not only doing his level best but that he is to be praised and encouraged for the courage with which he tackled the problems of sound pictures which were thrust upon him practically overnight. They realize today that the faults of sound in any particular theatre may be due to a number of causes—inferior equipment, poor acoustics, faulty prints or discs, among many others. And knowing these things they naturally are more sympathetic toward the problems of the projection room.

¶ *Projection the Pivotal Point*

TWELVE months from today the projectionist will be a figure of even greater importance. In the gradual settling process his place of business high up near the ceiling of the theatre will be the pivotal point of the whole business of exhibition.

Probably the last section of the industry to awaken will be the exhibitors. Most of them are still pursuing a blind policy of buying willy-nilly, disregarding all advice in their rush for a bargain in price. The next year will work a great change in them. Many of them who are unwilling or unable to change their perspective are disappearing, and their places are to be taken by a new alert businesslike type. All hands in the industry must keep step with the march forward.

Meanwhile, projectionists have every reason to be proud of the accomplishments of their craft within the past year. The difficulties encountered have been many—enough to tax the resources of the finest crafts. The manner in which the projectionist craft has met and overcome these difficulties will ever be a credit to it. The industry's leaders now unhesitatingly accord the craft recognition as one of the most important units of the business. With the progress of the coming year the projectionist craft must and will keep step. Their record of the past twelve months demands it.

See Your Theatre Manager NOW About This

All Projectionists will be interested in these



Two Synchronized Turn Tables

which

can be used with your present non - synchronized sound equipment. Simply attach the turn tables to your projectors and to your own Amplifier and Speakers, and you are ready to run the Standard 16″ Synchronized discs.

All gears steel and bronze, submerged in oil. Gives absolute synchronization, quiet operation and long life. Weight about 150 lbs. each unit. Complete with high grade pick ups and fader.

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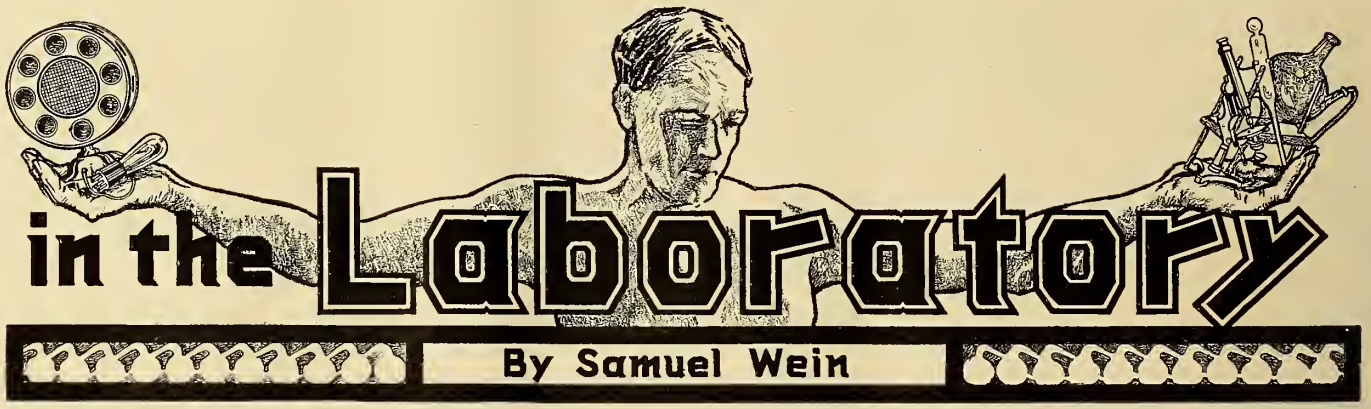
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Concerning References

ALL of the references given as footnotes to the text in this department are abbreviated as a matter of convenience for cataloguing for future reference. The publications which will be cited as references may be seen in the public libraries of the larger cities, as well as those in the various engineering societies. These technical publication abbreviations are standard with the various technical libraries, and a reference herein will simplify the task of locating material on a given subject.

Copies of American patents referred to in the text may be purchased for ten cents per copy by writing the Honorable Commissioner of Patents, Washington, D. C., giving the number of the patent desired together with the inventor's name.

Foreign patents cannot be secured through the U. S. Patent Office; but photostat copies can be secured at a small cost per page. The U. S. Patent Office maintains a complete photostat department for such purposes. The cost of this service may be learned by writing the Commissioner of Patents, who will forward copies upon receipt of remittance.

Disc Recording Apparatus

RECENT developments in recording disc records necessitated a new form of recording turntable to provide for the exacting requirements in production of disc records, particularly those used in sound motion picture work. August Coppola of New York City has recently designed and patented a recording turntable which is used extensively by a large producer of records for sound pictures. This turntable is shown in the accompanying illustration (Fig. A.)

The revolving table upon which the "recording wax" is placed is 20 inches in diameter, permitting the production of large recordings. The machine is so designed that by means of the bottom lever the turntable will revolve at 33 1/3 r.p.m. The top lever controls the rate of motion of the turntable to any desired number of r.p.m. This latter feature of the apparatus may be arranged for experimental recordings, if so desired.

Noiseless and Vibrationless

Adjustable collars on the feed screw stops the turntable at any predetermined place, so that records of a given length can be made at will. The synchronous motor operating this turntable is absolutely noiseless and vibrationless, as is the mechanical movement of the turntable. The starting and stopping of the turntable is controlled by a button, which is shown in the illustration on the front of the machine. The starting and stopping of the turntable is free from sudden jerks. The table runs smoothly and without the slightest hum.

A turntable used in making disc records may be considered as an ordinary lathe with a flat revolving table. Devices formerly built for this purpose were made to operate from a falling motor weight, i. e., a weight was made to drop from a given height to the floor. In order to compensate for the accelerating weight dropping to the floor, governor control was established. Modern methods for the production of disc records demand ideal conditions, and the present design by Coppola would seem to successfully meet all conditions.

New Types of Light Valves

ANY device that varies a steady source of light by means of sound or electrical impulses may be termed a "light valve." The term "light valve" may be misleading to some; however, this term most simply expresses the means by which a steady source of light is varied in direct proportion to electrical or sound impulses. As a matter of fact, considering the action of such a device. it is nothing more nor less than a valve.

Technical and patent literature shows many methods by which sound variations were made to actuate a device which would vary a source of light. Almost every conceivable physical phenomenon has been tried as a means of actuating a light valve. There still are a few peculiar and most interesting physical phenomena that have possibilities as light valves, and it is the intention of the writer to review them from time to time.

The "Majoranna Effect"

Majoranna in 1902 discovered that iron hydroxide solutions in a magnetic field reacts according to the direction of the lines of force of the magnetic field.

The writer recently had the opportunity of witnessing the performance of a new light valve made by Eugene A. Lauste, a pioneer experimenter in the sound motion picture field, wherein the "Majoranna effect" was the principal by which the device functioned. We are fortunate indeed in being able to publish for the first time a picture of this new

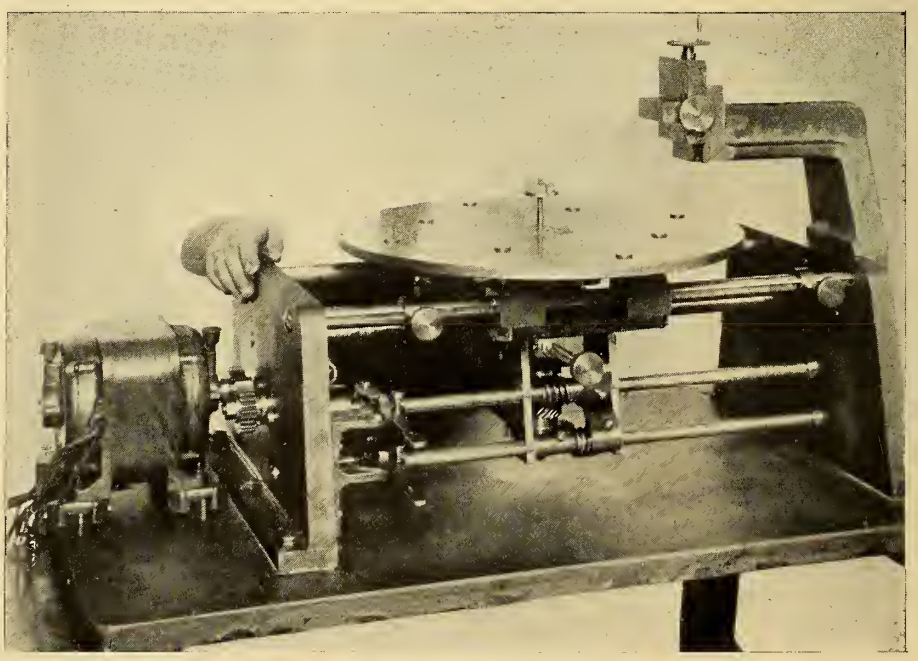


Fig. A—Front view of Coppola late-type disc recorder

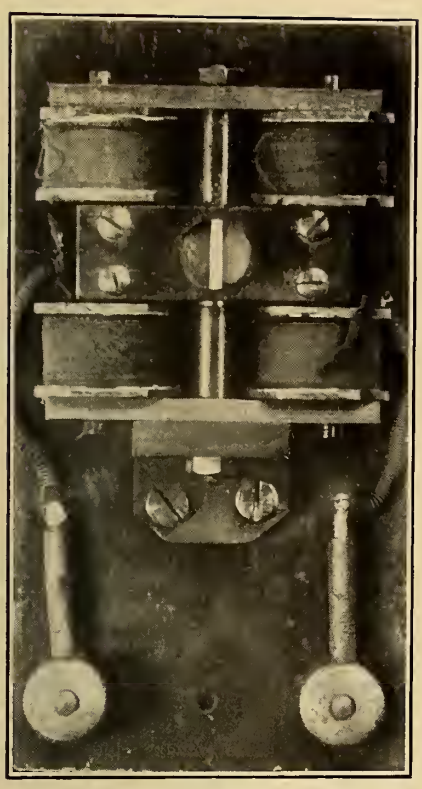


Fig. B—Lauste light valve

light valve, with the permission of its designer, Mr. Lauste. (Fig. B.)

Here we see a glass vial in the electromagnetic field. This vial is filled with a proper colloidal (finely suspended), magnetic solution, of a brownish-red color. We are unable to state the exact nature of this solution because of certain patent protection desired by Mr. Lauste. The two terminals leading into the magnetic field are connected to the output of an amplifier.

Response to Magnetic Change

If a source of light is focussed onto the vial containing the translucent liquid contained therein, it will be unable to pass through it. However, if sound variations are picked up by a microphone and are then amplified, and the electromagnetic field is varied, the liquid will respond to these magnetic changes, thus permitting more or less light to pass through it. These light variations vary, of course, directly in proportion to the sound variations first set up.

Preliminary tests made by Lauste indicate that his new form of light valve shows linear relationship of over 5,000 cycles, which make it an ideal means for sound recording.

In subsequent issues we will tell more of Mr. Lauste's early work with sound motion pictures, particularly with regard to the methods employed by him in recording sound on film, a subject to which Lauste has made many important contributions.

Early Workers in the Art

ONE of the earliest contributors to the art of recording sound photographically on motion picture film and thereafter reproducing same by means of a light sensitive cell, was Ernst Walter Ruhmer, a famed German technician, whose work in this science is daily commanding increasing respect from scientists the world over.

Ruhmer was not seeking to solve the problem of "synchronization" of action and sound, being more interested in the phenomenon of light and its effect upon selenium. In addition, he was actively engaged in research and experiment on wireless telegraphy and telephony. However, we are interested at present only in his work with sound motion pictures, and his major work in this art will be reviewed briefly here.

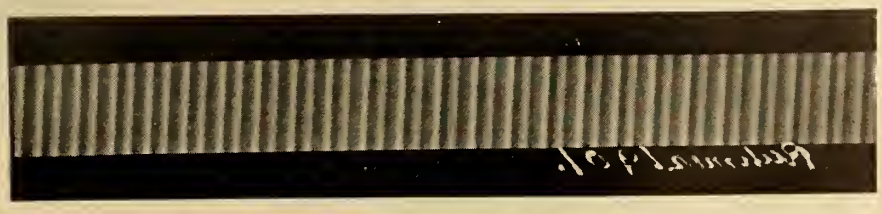
Ruhmer was interested in sound motion pictures for many years, but his best work on the subject was done between 1901 and 1907, when he developed certain procedures which helped immeasurably in the progress of the art.

Offers Sound Film in 1905

It is interesting to note here that Ruhmer actually did make "kinematographic records" (as he termed them), as early as 1901 and reproduced them by means of a light sensitive cell (selenium). In 1905, in his *Physical Apparatus Catalogue*, he quotes the "Photographaphone" (the name he applied to his device for recording and reproduction) at 1,000 marks ($250), and 5 marks ($1.25) per meter (39.37 inches) for the film on which was recorded a selection played by a brass band.

It will be well to note just what progress had been made in the art prior to Ruhmer's successful recording and reproduction of sound. These earlier developments are important, as they formed the chief props of subsequent experimenters' work.

Professor Simon in 1898 discovered that if an arc lamp fed from a D.C. source was in the vicinity of an A.C. or intermittent current, the arc lamp would respond faithfully to these variations, whether or not the A.C. or interrupted source of current was connected to the D.C. supply. In other words, the intermittent or A.C. current would form a superimposed current on the D.C., and the



Sound record on film made by Ruhmer. The reversed legend which appears in the lower right corner reads "Ruhmer, 1901."



Ernst von Ruhmer

arc would vary its brilliancy accordingly; not only that, but it would also behave as a sort of elementary loudspeaker in itself.

The "Duddell Arc"

This latter discovery was soon the subject of considerable discussion among investigators, and very soon numerous contributions to or refinements on Simon's process were made. Dr. Duddell discovered that, if a capacity and inductance be connected in with the D.C. arc, it would give rise to a continuous sound pitch. The rate or period of this pitch depended directly upon the two values of the capacity and inductance. That the brilliancy of the arc varied just as well as did the pitch it gave rise to was established by measurements made in the laboratory.

It is interesting to record here that the aforementioned discoveries were the first contributions to the establishment of what is now known as an "oscillating circuit," which was the first practical form used in laboratories where such a device was needed—at least, until other and improved forms were introduced, i. e., the mercury arc oscillator of Vreeland, and the three-element vacuum valve of De Forest.

The logical deductions made by physicists and experimenters at that time were that, if the capacity or inductance of the oscillating arc were varied sufficiently, and at proper sequences, a sort of musical piece could thus be produced. These deductions were soon proven correct by the employment of a large condenser with taps at frequent places, and similarly with an inductance coil. These were connected with a keyboard. Thus a musical theme was played by depressing the proper key corresponding to a given capacity or inductance. This contribution was known as the "musical arc."

The "Speaking Arc"

The next contribution was in connecting the secondary of a microphone induction coil into the oscillating arc circuit, while the primary of the coil was connected to a battery and a microphone. By speaking into the microphone there was set up an

induced current in the oscillating arc, and these variations in the circuit would be apparent in the arc itself, i. e., the arc would speak the same as that originally spoken into the microphone, and at the same time, the brilliancy of the arc would vary proportionately to the speech input into the microphone.

The technical and patent literature was soon replete with modified and improved forms of securing the best and most consistent results in the "speaking arc." These references may be seen in the earlier works on wireless telegraphy and telephony.

The early experimenters with the speaking arc used it as a means for wireless telephony by two methods: (1) by using the variable arc light to effect a light sensitive cell (selenium), on the receiving end, and (2) as a means of transmitting by aerial and ground somewhat in the same fashion as we now do in radio. The results attained by the experimenters at that time were considered ideal, as might be expected.

An Optical Slit

Much of the better work with the first method described above was done by Ruhmer. In his experimental work, it occurred to him that he might make a permanent record of the light variations set up in the speaking arc by means of the telephonic currents, so that he could make studies of this phenomenon at will. Accordingly he constructed a rather crude camera to accomplish this result. The camera consisted of a strong wooden box with an upper and lower magazine. The film was run from the upper to the lower magazine through a "gate" in which only a fine slit of light over the width of the motion picture film was exposed. The source of light from the speaking arc (hand feed) was focussed through a cylindrical lens to form the optical slit on the motion picture film.

The oscillating source of light was thus photographically recorded. From the negative thus obtained, a positive (print) was made. Accurate measurements of the sound frequencies could have thus been calculated by knowing the number of variations in a given length of film and by accurately measuring the velocity of film run through the camera in a given time.

Reproduction

It seemed quite obvious to Ruhmer that these variations in light on the motion picture film might be reproduced by means of varying a constant source of light focussed through the same optical slit through the film and affecting the selenium cell. This was tried, and the results were gratifying indeed.

The foregoing work in an art in its embryonic stage certainly did disclose much of our present knowledge as to the requirements in sound recording on motion picture films by photography and reproducing same by means of a light sensitive cell.

In a summary of his description of this apparatus Ruhmer said that "this method of sound recording will eventually solve the problem of talking motion pictures, i. e., synchronization between action and sound created by the actors." And so we had the embryonic form of sound recording on the motion picture film and a means for reproducing same therefrom; but it took further developments along other lines of endeavor in the arts to produce a refined means for modulating a source of light and a means for amplifying the weak electrical impulses resulting from exposing a light sensitive cell to the varying slit of light falling thereon. It was these later contributions that materialized Ruhmer's earlier work.

Used a Gas-Filled Tube

A later development was Ruhmer's use of a "gas-filled tube." This consisted of a glass bulb with two electrodes fused therein, and spaced apart a fraction of an inch. The bulb contained helium at a low pressure. Originally the tube was used by Ruhmer to indicate "resonance" in his radio telegraph system. It must be remembered that the oscillating arc was the exciting means to feed the "resonance tube." Variations in speech caused the oscillating arc as well as the glow in the helium tube to vary. In his later work Ruhmer used the "glow tube" extensively for this work.

It may be argued by some of our modern contributors to this art that the methods outlined by Ruhmer were crude, and such is the case. However, the use of an oscillating circuit feeding a source of light which is varied by speech impulses and recording same on a film, and thereafter reproducing same is by no means new, and well known to those conversant with the art.

References

Ann. der Phys., Vol. 5, p. 803, 1901.
Der Umschau, Sept. 28, 1901.
Phys. Zeit. 11, p. 498, 1901.
Scient. Amer., September, 1901.
Elektrotech Zeit., Vol. 39, p. 1, 1902.
Nat. & Kult., Vol. 1, p. 38, 1903.
Elektrotech. Zeit., Vol. 6. 1, 1905.

Slits — Mechanical vs. Optical

WITHIN the past month one of the larger manufacturers of sound motion picture apparatus has formally notified the trade that they have brought a "suit in equity" with a view to bringing about a "perpetual injunction" restraining certain competitor firms from recording and reproducing sound from film by the use of, among other patents, a "slit" in either the camera or projector attachment. The plaintiff in this suit asserts that they control the patent situation insofar as the specific use of a "slit" for such purpose is concerned.

Without concerning ourselves at this time with the merits or demerits of the claims set forth in this litigation, we shall discuss certain phases of this "slit" situation and review briefly the development of slits and slots with relation to their bearing of present sound picture work. Sound motion pictures are today being subjected to a refining process, with practically all units of the apparatus receiving attention of investigators. We shall present here such data as is available on the "slit situation," which, it may be said, is one of the most important points in patent litigation today.

There are two known types of slits for sound picture work: (1) the mechanical type, in which the slit is actually cut in a metal plate, and (2) the optical type, where a slit is formed by optical means. Since the mechanical slit is now the subject of patent litigation, it would be well to confine our interests to the optical means for producing the slit. The optical slit, in our opinion, offers many advantages over the mechanical slit, not only from the standpoint of patent litigation but solely from that of efficiency.

Mechanical Slit Troubles

1. Manufacturing a fine slit in a metal plate presents many mechanical difficulties. The process requires precision instruments and constant expert attention. In a large number of these mechanical slits the dimensions are found to vary greatly, despite the utmost care exercised in their manufacture.

2. Mechanical slits do not permit all of the available light to pass through, and therefore one is compelled to greatly increase the source of light. This increase in illumination again brings us to the design of a new form of exciting lamp, specially made for the purpose. Or, in the reproducing attachment, it necessitates the use of an extremely sensitive cell which will respond to weaker illumination.

3. Mechanical slits soon become clogged with dirt and other foreign matter which interferes with the light and affects the film in the camera by producing an uneven light source. In a projector attachment a clogged slit seriously interferes with good reproduction, as is known by every projectionist.

These are the major difficulties experienced with a mechanical slit, but there are others.

Mechanical Slits

Fritts, a celebrated worker in the early days with the selenium cell, conceived the idea to photograph the voice-modulated light through the medium of a fine slit cut in a metal plate, and thereafter reproduce same from the film by means of the same slit in the metal plate, using the selenium cell as the light sensitive cell. This cell was connected in series with a battery and a telephone receiver. The filing date of the patent application was October 22, 1880, and the patents were granted after a lapse of 36 years.

It is our intention at an early date to discuss in details the patents involved, but it is sufficient here to state that the specific use of a "slit" is referred to, which makes the "patent situation" already mentioned one of considerable speculation.

Case's Method

Case forms the slit either in the recording tube, as by means of a metal plate with the slit, or on the glass bulb of the record-

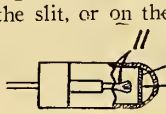


Fig. 1



Fig. 2

ing tube, as seen in Figures 1 and 2. Nakken forms the slit on the photo-electric cell.

Case deposits on one side of a glass plate a thin film of metal, preferably silver, and the slit is scratched therein, and the surface is thereafter coated with a transparent lacquer. A modified form is to produce the slit on the metal film deposited on the lens itself. (Figures 3 and 4.)

Instead of scratching out the slit in the metal film on glass as outlined by Case,



Fig. 3

it is recommended by the present writer to etch the metal film on the glass plate or lens as is practiced in the photo-engraving arts. In this manner duplicates can

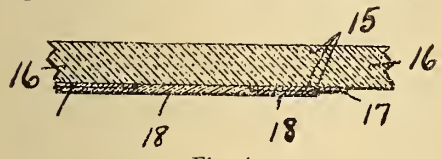


Fig. 4

very readily be made at a low cost, with accuracy insured.

The present writer has had some experience with what might be termed a "photographic slit." This was made by first making a large scale drawing of the slit, and a photographically reduced negative was made therefrom, which served the purpose admirably. This methed permitted the production of duplicates at ease.

Use of Optical Slits

Ruhmer undoubtedly was the first to have actually made practical use of an optical slit. In his system of making sound records on film he made use of a cylindrical lens. Tschopp uses an optical wedge for confining the light beam to a fine slit form. The wedge may be seen in Figs. 5 and 6. The wedge may be made of either quartz or optical glass. The wedge itself is ground and polished to produce a flat face corresponding to the desired image dimensions to be formed on the film. The balance of the transparent portions of the lens wedge is painted off with an opaque varnish to prevent stray light from affecting the film.

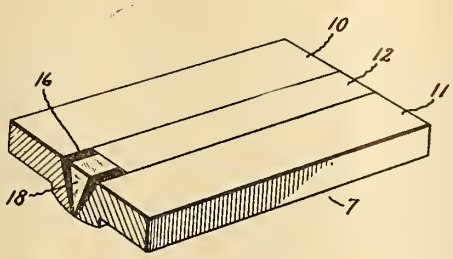


Fig. 7

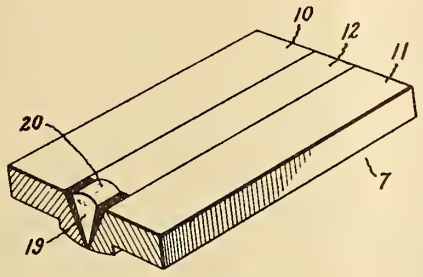


Fig. 8

Hoxie forms a somewhat similar form of wedge, excepting that he has it so designed as to form a lens to further concentrate the light through the wedge. (Figs. 7 and 8.) Hough modifies the former types of wedges in the manner shown in Figs. 9 and 10.

Professor Hardy of the Massachusetts Institute of Technology discusses very

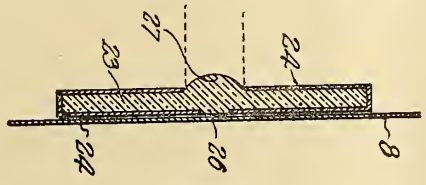


Fig. 9

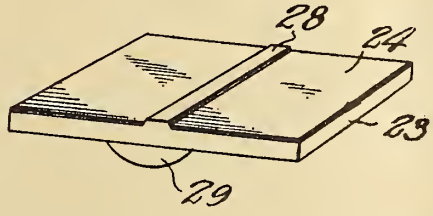


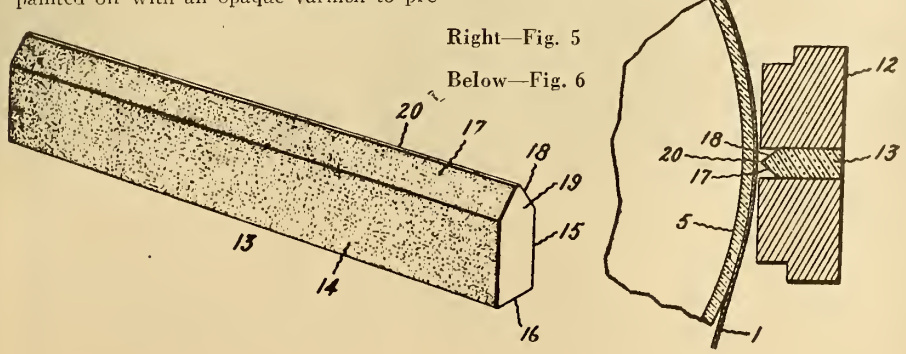
Fig. 10

interestingly the theoretical and technical aspects of mechanical and optical slits, the while strongly advocating the use of the latter type. He discusses a method in which the source of light (recording glow tube or exciting lamp) is focussed through a coarse slot which, by means of a microscopic optical arrangement, is reduced to the fine slit desired. Just such an optical system is now used in the projector attachment designed by Rudolph Miehling for the Royal Amplitone equipment. The results obtained with this system are ideal.

Recently we have seen one experimenter form a so-called mechanical slit by bringing sufficiently close together two metal plates to form the desired fine slit. The two plates are brought together by means of a micrometer screw adjustment.

Right—Fig. 5

Below—Fig. 6



References

C. E. Fritts, U. S. Pat.
No. 1,203,190 Oct. 31, 1916
1,203,191 Oct. 31, 1916
1,213,613 Jan. 23, 1917
1,213,614 Jan. 23, 1917
1,213,615 Jan. 23, 1917
T. H. Nakken, Patent application filed.
T. W. Case..... 1,605,528 Nov. 2, 1926
1,647,504 Nov. 1, 1927
J. T. Tschopp..... 1,618,117 Feb. 15, 1927
C. A. Hoxie..... 1,646,249 Oct. 18, 1927
C. W. Hough..... 1,646,292 Oct. 18, 1927
A. C. Hardy, Trans. Soc. Mot. Pic. Eng., Vol. 9, p. 475, 1927.

See British "Guild" As Step Toward Union

British projectionists, hitherto unorganized, have banded together and formed an organization which will be known as the "Guild of British Cinema Projectionists and Technicians." At the first meeting of this new organization many requests for membership from projectionists throughout the British Isles were read.

While the announced program of the organization makes no mention of the Guild interesting itself in any but purely scientific aspects of the projectionist's work, close observers of the situation see in the organization's formation the preliminary step to the moulding of a strong, centrally-directed labor organization which will be modelled after American labor unions.

Recently there has been considerable comment among English projectionists on the matter of working conditions and wages, and it is held that the Guild will eventually come to a consideration of these matters with a view to placing the British projectionists on an even footing with their American brothers insofar as conditions and wages are concerned.

Careful Handling Prolongs Life of Vacuum Tubes

One usually reckons the life of a vacuum tube by the number of hours it is used, but there are other important points which have a bearing on the matter. All other things being equal, careful attention to the manufacturer's instructions on handling and operation will help to prolong considerably the life of a valve.

Care should be taken never to jar valves. While this will seldom destroy the filament or heater, it will often derange slightly the relative positions of the elements, which will change the amplifying characteristics of the tube.

When tubes are repeatedly short-lived in a particular apparatus, all voltages should be checked by an expert, and an efficient voltage installed, if necessary. When noisy valves are encountered, they should be removed from their sockets and the prongs cleaned with a nail file. It is, of course, imperative that all valves be placed in their proper sockets.

Valves should never be removed while the apparatus is turned on.

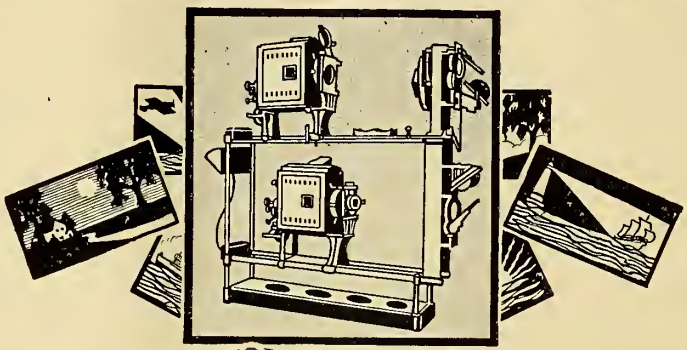
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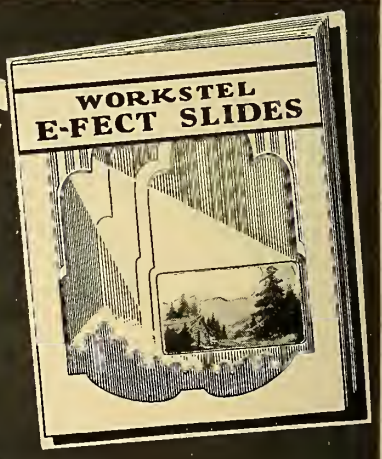
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Report of Standards Committee of S. M. P. E.

Herewith is presented a section of the report of the Standards Committee of the Society of Motion Picture Engineers which was formulated at the recent Spring meeting in New York City. Certain recommendations on projection work are included in this report which should prove of interest to every projectionist.

THE size and position of all ports are matters governed largely by local conditions. The main factors to be considered are type of equipment, size of theater and projection angle. Fundamentally, port requirements are very simple. The projection port should permit the projection of an image to any part of the theater required of that particular projector. In the case of the spot-lamps, flood-lights, stereopticon and effect projectors, and at least one motion picture projector, this will include the entire front of the auditorium.

The observation port should permit the projectionist to have full view of this area from normal operating position beside the projector in question. Satisfying these requirements is also a simple matter, but calls for careful checking of all dimensions. In some cases, it will be necessary to cut the ports with their walls flaring outwards if the projection room walls be excessively thick.

The fundamental requirement of port shutters is that they surely, quickly and quietly close all ports within a few seconds of the inception of any film fire. We respectfully recommend the system of shutter suspension and semi-automatic control adopted by the State of Pennsylvania, or that employed by the Chicago division of Publix Theaters.

Room Ventilation

Projection room ventilation has two separate and distinct functions. First, it must exhaust all of the hot gases from the arcs, remove foul air from the room, and maintain comfortable temperature at all seasons of the year. Second, it must be capable of exhausing all fumes from burning film, in the event of a film fire, as fast as they are formed.

This first requirement is best met by two independent systems, one for the room is general, and the other directly connected to the lamp houses. In the cases of the spot-lamps, stereopticon and effect projectors, this direct connection may not be practical, but for the motion picture projectors and the floodlights it is absolutely necessary. The room ventilation system should be capable of making a complete change of air in three minutes. The lamphouse ventilation system should be capable of keeping the temperature of the air in the vent pipe eight inches above the top of lamphouse at not more than 350 degrees Fahrenheit.

In Case of Fire

It is very doubtful if, for taking care of the fumes from a film fire, it would be unreasonable to recommend a system having a capacity of 5,000 cubic feet per minute. It should be capable of maintaining the barometric pressure in the projection room during the fire substantially below that of the auditorium so that none of the inevitable crevices will exude any traces of smoke or flame.

This committee realizes that this section of the report is far from complete, and intends to go more thoroughly into the matter of ventilation in the time between now and the next meeting of the Society, treating the matter somewhat in the manner of stock loss problems in power plant engineering.

Improved Projection Rooms

Now after all bare physical fundamental requirements have been taken care of there still remains a vitally important one which is often overlooked, although it is just as fundamental as those of a more definite nature. The audience sees the picture and other projected effects seated amid the most finished and luxurious surroundings that architects and artists can create.

Now if the projectionist views the same picture and effects framed by a dirty, oil-spattered unplastered wall festooned with a serpentine maze of conduit, etc., can his mental attitude be the same, can his standards of judgment be as high as those of the audience, no matter how conscientious he may be? Never. This psychological stimulus of fine surroundings is a truly mighty force. It is ample justification for the best finished projection suites that any architect can conceive.

The man who is not susceptive and responsive to these things has no place in the modern projection room.

Two New Improvements for the booth

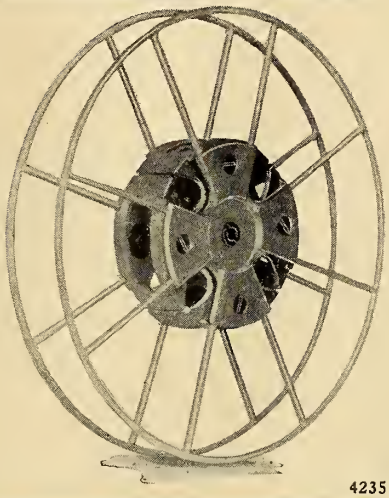
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

National Theatre Supply Company

Branches in All Principal Cities

THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

Three sizes. Eleven inch, $4.75 *F. O. B. Factory.*

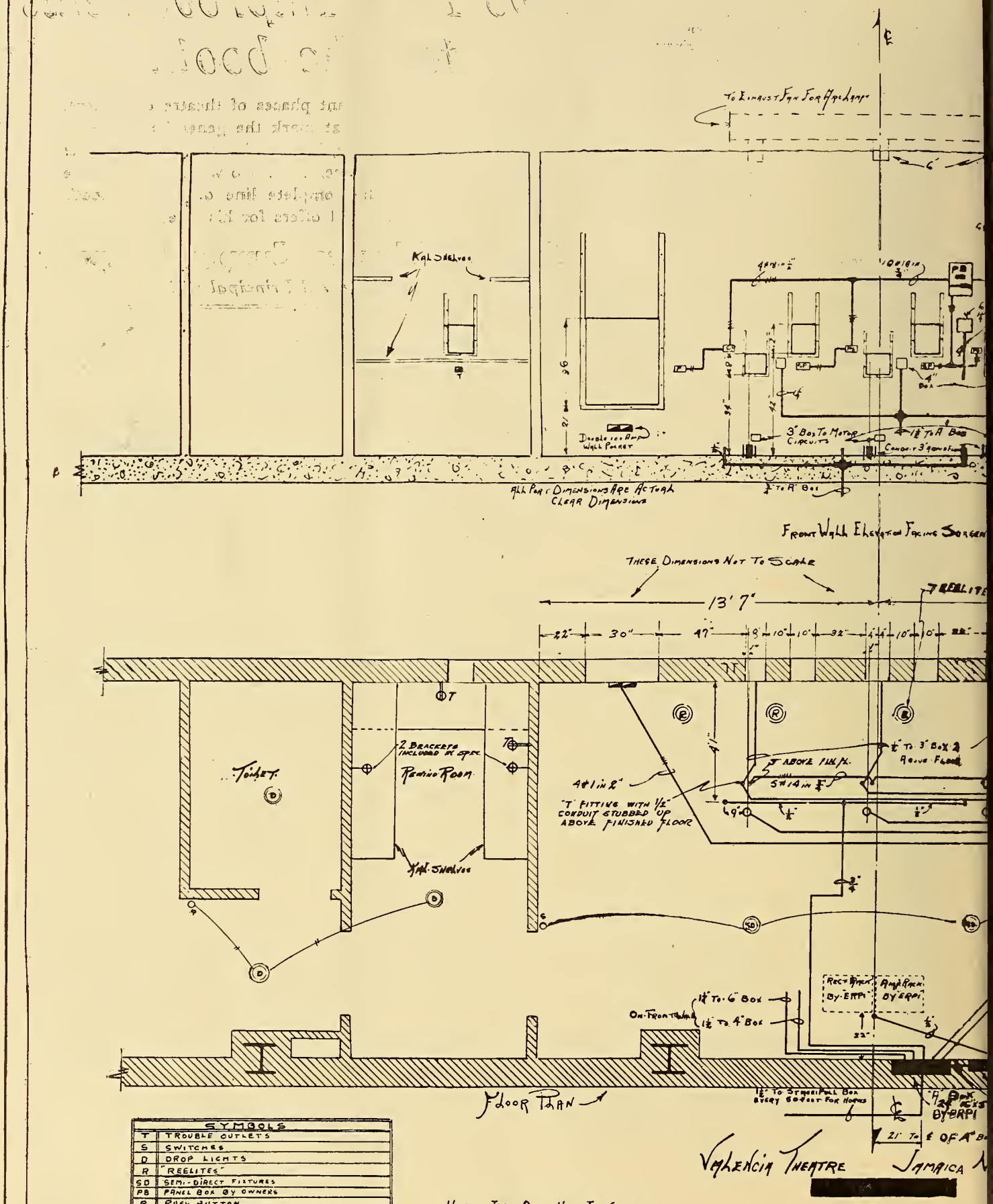


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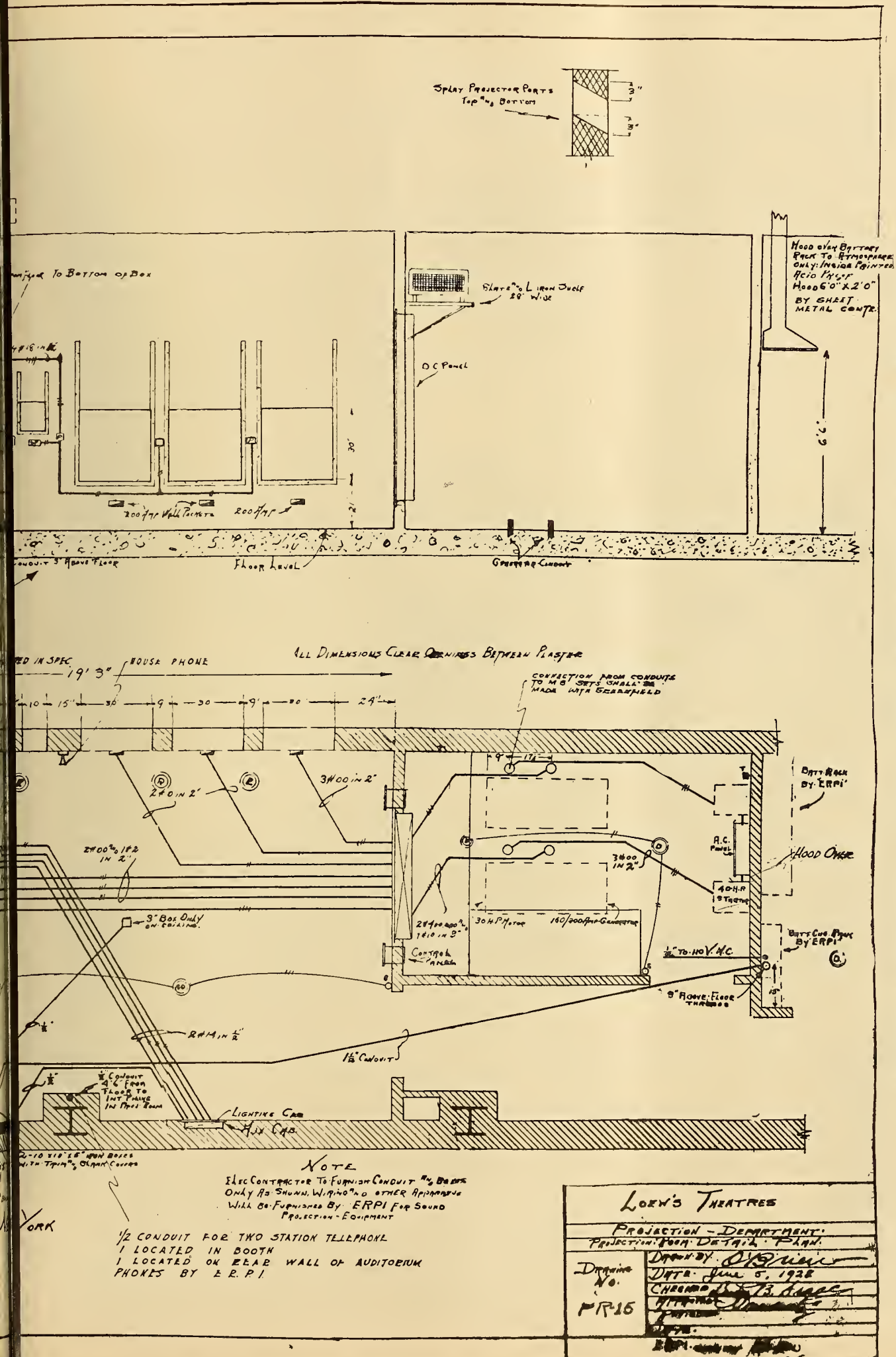
THERE are a hundred uses for this soldering iron in a projection room. This new electric iron eliminates the serious fire hazard and saves the time and trouble involved in the use of old style flame-heated irons. It may be used interchangeably with a melting cup or soldering tip, as illustrated. Convenient, reliable and economical.

Prices on request



SYMBOLS	
T	TROUBLE OUTLETS
S	SWITCHES
D	DROP LIGHTS
R	"REELITES"
SD	SEMI-DIRECT FIXTURES
PB	PANEL BOX BY OWNERS
P	PUSH BUTTON
PS	PUSH BUTTON & SPIND OUTLET
SP	SPEED INDICATOR OUTLET ONLY

NOTE - THIS DWG NOT TO SCALE

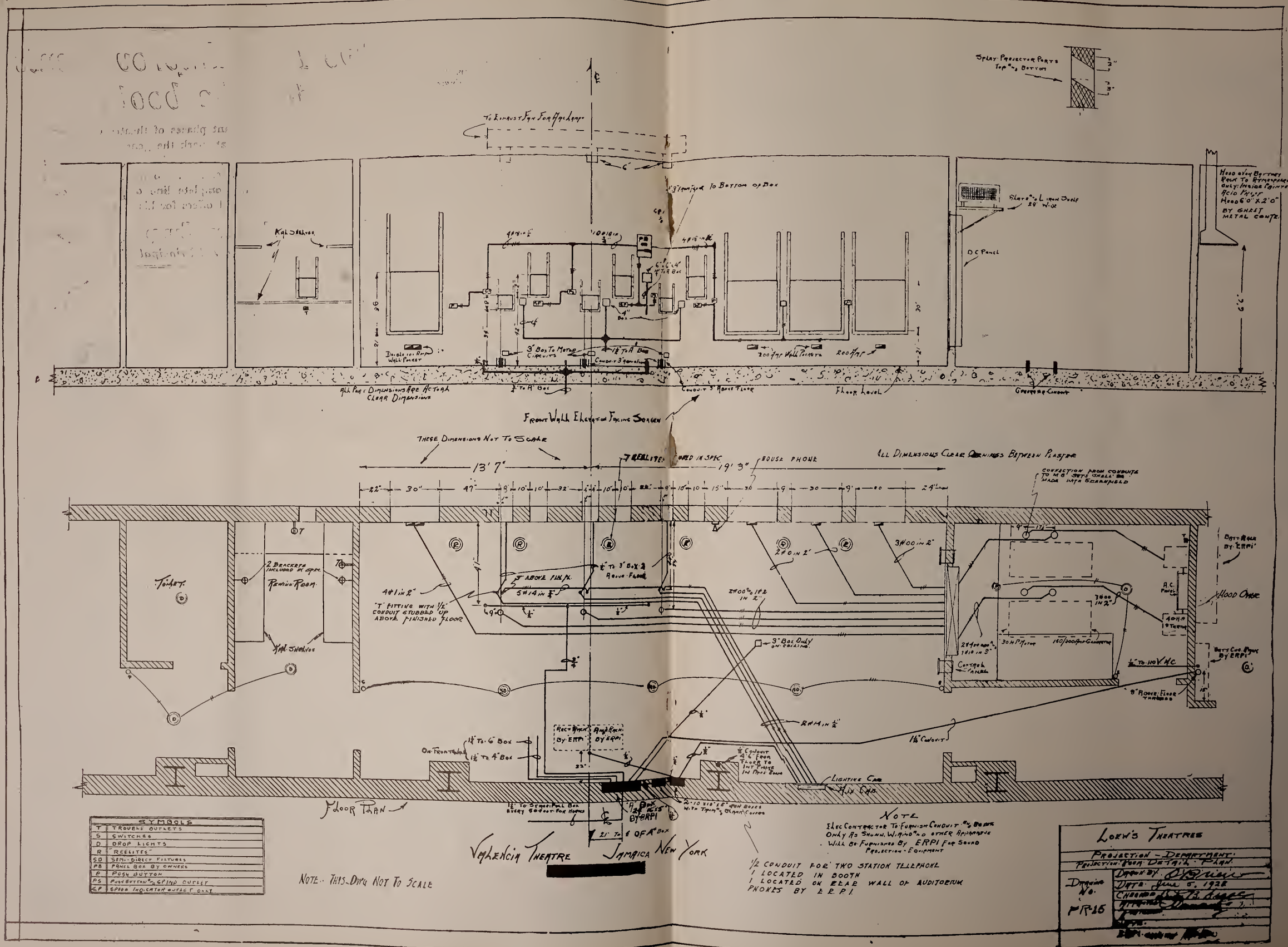


Detailed Projection Room Plan for Loew's Valencia Theatre

This room in the Valencia Theatre, Jamaica, L. I., N. Y., is considered one of the finest modern projection layouts in the world

Detailed Projection Room Plan for Loew's Valencia Theatre

This room in the Valencia Theatre, Jamaica, L. I., N. Y., is considered one of the finest modern projection layouts in the world



Here are a few Reasons why the ROTH Perfected 2-Bearing ACTODECTOR is the Best that money can buy

ROTH BROTHERS & CO.

"The Leader of the World"

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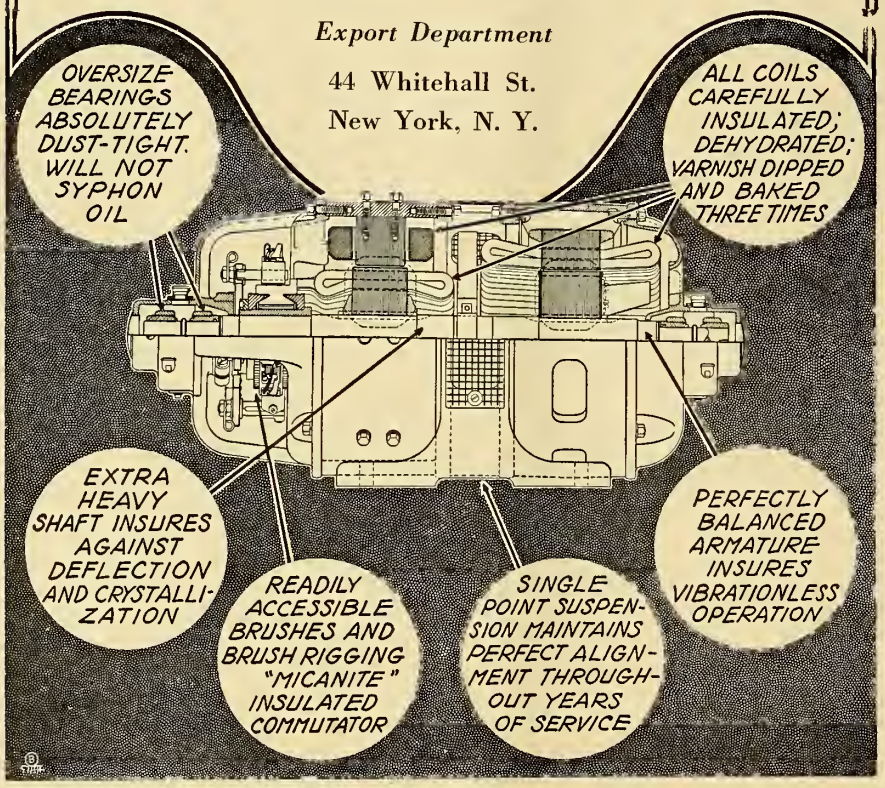
Division of Century Electric Company, St. Louis, Mo.

Distributors in all principal cities

New York Office—50 Church St.

Export Department

44 Whitehall St.
New York, N. Y.





Complete your sound equipment with a

"BEST"

Rewind Pulley

Takes the place of space collar on Reel shaft—Crank is not Removed

Manufactured by

BEST DEVICES CO.

2108 PAYNE AVE. CLEVELAND, O.

Price $3.00 at all dealers

Pacent Announces Two New Junior Models

FULL details on the two new Pacent Junior models for houses up to 500 seats were released this week by the Pacent Reproducer Corporation. Pacent, in issuing the statement, promised the small exhibitor machines which deliver the highest quality and performance. The new machines combine a number of new features.

There are two new Pacent models for houses up to 500 seats. The Type 500 DDA is for synchronous disc reproduction, and sells for $1,500. It has full double-channel amplification with a reserve amplifier for every amplifier used to run a show. No batteries are used in the operation of the system. The amplifiers operate direct from any 110-volt, 60-cycle A. C. source. Other features found in the new Junior model 500 DDA are constant speed motors, mechanical gear drive, and a new type of pick-up which tracks all records perfectly and has a remarkable coverage of the frequency range.

Late-Type Speaker

The latest type of electro-dynamic speaker is used in both the new Pacent models. This type of speaker, specially developed for small theatres, is said to give unusual power, with a large reserve to bring out the full effect of all programs.

The second of the new Pacent machines is known as the Type 500 FDA. It combines synchronous disc and sound on film reproduction. The price of this model, for houses up to 500 seats is $2,500 for both disc and sound on film. The features of the disc system are the same as those for the Type 500 DDA disc system, including full double-channel amplification, new type pick-up and mechanical gear drive.

Sound on Film

The sound on film section of the new Type 500 FDA combines several new and highly interesting features. Both the variable area and variable density methods are played with equal efficiency. The sound on film section is extremely simple to operate, due to special designed features. When disc is played it is not necessary to thread through the sound on film section. A specially designed optical system is employed, which with the special photo-electric cell gives the highest quality of reproduction by the sound on film method. A new feature in sound on film section is found in the periscope through which the projectionist makes a complete, quick check on sound on film operation.

The 2 Pacent models, Type 2 MDA and TYPE 4 MDA for houses up to 4,000 seats are continued as regular items. No price change in these models has been made and none is contemplated according to the Pacent Corporation.

A New German Projector Arouses Much Interest

One of the features of the new Triumphator projector manufactured by A. E. G., is the conical drum type shutter which is mounted in a spherical housing behind the gate. The intensity of light

Coast Official Warns of Influx of Labor to California

A COMMUNICATION received recently from Secretary R. L. MacDonald of Local Union 150, Los Angeles, California, stresses the inadvisability of projectionists travelling to California and there expecting to secure work on short notice. California climate has come in for extensive advertising within recent years, and many workers set out for the West Coast without any definite promise of work. Portions of Secretary MacDonald's letter is reprinted herewith:

"Due to advertising of the wonderful climate of California and the growth of Los Angeles, projectionists from all parts of the United States and Canada have flocked here in great numbers. This brought about a situation where there were more men than places of employment.

"With the coming of sound pictures this local has been able to make some progress in overcoming this evil, but there still is and will be some unemployment in our trade for some time to come.

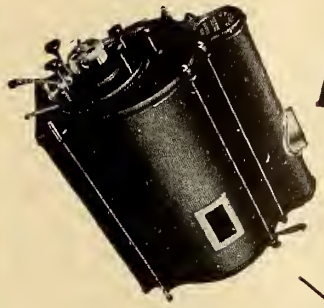
"Do not be deceived by advertisements, for there is no employment to be had in this city at the present time, nor any prospects of any in the near future. There is a city ordinance whereby every projectionist must be licensed and it is folly for anyone to plan on coming to Los Angeles before investigating the matter thoroughly. If anyone is contemplating a trip to this city expecting to go to work, it would be wise for them to communicate with this organization before doing so, or have at least enough to live on for a year."

Gold Card to Dempsey

Fred J. Dempsey, President of Stagehands Local Union 11 of Boston, Mass., and First Vice-President of the International Alliance, was tendered a gold card of life membership by operators Local Union 182 at a recent meeting of the latter organization. The presentation was made by Secretary James F. Burke, who lauded the accomplishments of Vice-President Dempsey both in Local Union and International Alliance work.

The presentation of the gold card was marked by an appreciative demonstration by Local Union 182 members in honor of Vice-President Dempsey, who is extremely popular throughout the New England district.





Ask the Projectionist Who Uses Them!

Eliminates Use of Relay Arc Control

STRONG Automatic Reflector ARC LAMPS

For Sale by Trustworthy Independent Supply Dealers Everywhere

Export Office—44 Whitehall St., New York City, New York

The Strong Electric Co.
2501 Lagrange St. Toledo, O.

is not decreased by use of a back shutter, the company claims.

The machine is mounted on a heavy square pedestal stand with a worm drive for tilting. Although the film track is open and accessible, the working parts are enclosed and therefore dust proof. Lubrication is practically automatic, the gears running in oilbaths, each fitted with visible oil gauges. Masking, it is claimed, is effected by a vertical movement of the sprocket and mechanism, the motor belt tension being maintained by a counterweighted jockey pulley.

The intermittent movement is of the usual German type. A special device is provided for slide projection by a mirror arc. This consists of a mirror which can be swung over to the front of the lamphouse at an angle of 45 degrees, reflecting the light through a concave lens on to another mirror, thence through a condenser and on to the slide; the black shadow is thus claimed eliminated.

Third Dimension Process Being Developed

A third-dimension process is now undergoing tests at the Brooklyn, N. Y., studios of the Vitaphone Co. which employs two projectors to project alternate images to both eyes. Considerable research work on this new process has been done in Dallas, Texas, with the inventors expecting to complete their experiments in the Vitaphone studio.

In describing the process, one of its sponsors, L. E. Randall, Dallas university professor said:

2 Double-Lens Projectors

"The principle of the third-dimension movie is based upon optical illusion. Two projection machines will be used in such a manner that each alternate picture will be reflected in succession to the right eye, while each of the other alternate pictures will be reflected to the left eye. The machines will be equipped with double lenses, one projecting images with violet rays, the other projecting light which is deficient in actinic rays. These two images build on the crossed lines in the screen into images, giving the impression of depth to the audience."

One Thing It Lacks!

The Transverter

is devoid of Temperament

It takes high or low voltage, line interferences, alternating "juice," and smooths them out into constant, even voltage, direct current.

Within 3%—that's its record—better than is obtained from the average D. C. Power line.

"If you show pictures—especially if you run 'Talkies'—you NEED the Transverter."

Sold in the U. S. A. by
The National Theatre Supply Co.

Canadian Distributors
Perkins Electric, Ltd.

THE HERTNER ELECTRIC COMPANY
Transverter
12688 Elmwood Avenue Cleveland, Ohio, U. S. A.

Exclusive Manufacturers of the Transverter.

Order Your FOLDER Now!

The list for these attractive and durable folders will close shortly. Avoid disappointment by placing your order early, as only a minimum number of these folders will be available at one time.

$2.00 each—while they last—An Ideal Gift

New Walker Soundscreen Adopted by Circuits

MANY of the leading circuits in the country have adopted the new Walker Soundscreen as standard equipment for their theatres with sound apparatus installations. Adoption of the Walker screen came after exhaustive tests with all makes of screens, both sound and silent. These tests showed that brilliant, sharp projection is obtained with the Walker screen even with low intensity lamps. Contrast between black and white is very sharp, producing a picture which, while not glaring, appears very bright by reason of this decided contrast.

Special Coatings

Eleven coats of a special pyroxylin containing pigments of unusually high reflective quality form a very thick and efficient surface, which is warranted to be 50 per cent brighter and whiter than regular whites. As white is not opaque—which a screen should be—the back carries four coats of blue pyroxylin, preventing light from passing through the screen.

The perforations in the Walker Soundscreen cause a 9 per cent loss of light, which amount is more than offset by the big increase in reflective power. There is no fadeaway, the picture being as bright from the extreme side seats as from the front.

The exclusive Walker feature of double-staggered perforated pattern prevents any loss of definition. No parallel rows or

Amplifier Fundamentals

(*Continued from page* 11)

former is to step up the input voltage so that it may act more effectively on the grids of the amplifying tubes.

Push-Pull Amplification

These tubes are connected, so that they will work as push-pull amplifiers; therefore, when the audio frequency voltage is applied, one grid becomes less negative at the same time the other grid becomes more negative. This gives an increase of voltage in the plate circuit of one at the same time there is a decrease of voltage in the plate circuit of the other. This compensating action is continued as long as the amplifier is operating. The purpose of push-pull amplification, as already mentioned, is to remove as far as possible all traces of distortion in the audio-frequency output to the receivers, while permitting a very efficient use of the tubes.

The course of the audio-frequency impulses continues across the tubes V1 and V2, where they are reproduced in an exact form and greatly amplified in the plate circuits of these tubes. The output is through the transformer T2 and thence to the receivers at the horns.

The resistances, R1 and R3, connected respectively across the primary and secondary of T1, are used to balance the electrical characteristics of the transformer, so that it has the desired properties; R1 also serves as a load of the correct value for the amplifier preceding this one.

lines of holes are present to catch the eye and interfere with definition. This pattern prevents the strabiscopic effect produced by parallel lines, which tends to fog definition on moving images, and limits the visibility of holes to eleven feet.

Larger Perforations

This pattern also permits the use of a larger hole, assuring better sound transmission, and leaves more area of solid surface between holes, making the screen stronger and leaving more unbroken area for the picture to form upon. These holes are distributed uniformly with mathematical precision, so that there is a series of holes every 1/16" on both the vertical and horizontal. These large holes do not clog easily with dirt.

Repeated tests have proven that no difference in volume or in quality of sound can be detected either with or without the screen before the horns. Measured by an audiometer, impedance is only 1½ transmission units, which the ear cannot detect.

No Feedback

Feedback, or echo back into the horns—as is the case from a smooth-backed screen—is prevented by roughening the surface of the back with circular indentations. The surface of the screen cannot turn yellow, as the special pigments and pyroxylin used have no photochemical reaction, as do most whites subject to light. The screen may be washed when dirty, while in place, with warm water and soap without injury to the surface.

The Walker Sound screen is made of a special Du Pont material which is made exclusively for the Walker Screen Co. The pyroxylin composition on the face and back of the screen is specially made and is protected as to design and structure by U. S. patents pending.

New Sound Horn Lift Saves Valuable Stage Space

The Earl B. Hough Co. of Chicago, Illinois, makers of the well-known Hough Organ Lift, announce a new automatic sound picture horn lift. The problem of what to do with horns while a stage act was on was only partially solved with the introduction of movable horn towers which permitted the rolling-off of the horns into the wings. The one objection of these towers was that they required much valuable stage space.

The Hough horn lift is installed under the stage floor and is operated automatically much in the same fashion as is an organ lift. The horn lift is contained within a ceiling height of 8 feet below the stage and has an upward travel of 15 feet or more, as required. It is powered by a 1½ horsepower motor, driving a cable consuming drum through a ball-bearing steel and bronze worm gearing and operates in a dust-proof oil bath. The raising or lowering operation, which is silent, requires 45 seconds.

Pushbutton Operation

The lift is operated from a push button located on the stage switchboard, with the lift, when traveling either up or down, stopping automatically at the predetermined end of travel. The National Theatre Supply Co. will furnish full details of this unit.

"The Lens That Puts Perfection in Projection"

A New Triumph In Projection Lens Development!



WITH leading projectionists in important theatres the country over, still sending us voluntary and enthusiastic endorsements of the Ilex F:2.5 Projection Lens . . . Ilex now announces a new feature that truly represents a new triumph in projection lens development.

The new exclusive Ilex features are: (1) the exact adjustment of the focal length to the screen size used in the theatre; (2) overcomes entirely unsightly slopover or incomplete screen covering; (3) secures proper adjustment by turning front mount backward or forward until the screen is properly filled—lenses then locked by tightening lockring; (4) eliminates by a combined mechanical and optical innovation the specifying of "plus" or "minus" with the focal length ordered or to make selection from several lenses before obtaining one which renders the exact screen covering required.

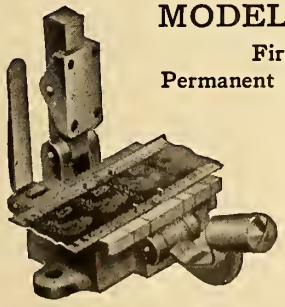
How definitely superior above all, this new improved Ilex F:2.5 Projection Lens really is cannot be appreciated until tried. Its greater brilliancy and greater sharpness are a revelation. Write today for further information.

ILEX

OPTICAL COMPANY

ROCHESTER *(Established 1910)* **N. Y.**

Universal Film Splicing Machine



MODEL NO. 3 Pat. March 22:22

First-Class Results on New or Old Film

Permanent Gauge **No Adjusting**

FOR THEATRES, EXCHANGES LABORATORIES, SCHOOLS

Price $6.00

GENERAL MACHINE CO., INC.

816-826 East 140th St., NEW YORK, N. Y.

For sale by all Supply Dealers

A SOUND FILM *for the* PRESENT *and the* FUTURE

IN THE early stages of the talkie era Eastman scientists set themselves to the task of evolving a special negative sound film.

They started from scratch. They studied the fundamental requirements of sound recording film. They took into account all the essential properties of such a film. They scientifically *measured* the fidelity of the sound recorded with their experimental emulsions. They detected and eliminated inaccuracies and distortions too minute for the ear to register. They arrived at a final formula—a definite achievement in the art of sound ....*Eastman Reprotone Negative*.

Designed specifically, exclusively for sound recording, *Reprotone* is the logical negative medium for sound at its best. Because of its inherent and complete *rightness* it will keep pace with the other factors in the industry. It was built for today, but if the demands of tomorrow are still more exacting, *Eastman Reprotone* will meet them.

EASTMAN KODAK COMPANY
ROCHESTER, NEW YORK

Mellaphone Installs 24 Within Two Weeks

WITH 24 installations made since June 25, the Mellaphone Corp. of Rochester, N. Y., now has more than 200 installations of its sound picture equipment in theatres throughout the United States and Canada. Orders for Mellaphone equipment continue to pile up, and it is not unlikely that by September 15 more than 300 installations will have been made.

Installation of Mellaphone disc attachment is extremely easy. On the double-bearing Simplex projector, it is necessary only to remove the flywheel lock nut and replace with the special nut furnished. On the single-bearing model, one simply removes the flywheel and replaces with the special flywheel furnished. Mellaphone attachments are also supplied for Powers and Motiograph projectors.

Performance Guarantee

Mellaphone equipment is sold on a strictly satisfaction-guaranteed basis. It is guaranteed to give absolute synchronization, quiet vibrationless operation and long life. It is sturdy and well-built, as only the highest grade materials are used. A group of fine mechanics insures precision work.

All gears are of bronze and hardened steel and are submerged in a bath of oil.

The Mellaphone equipment includes two pedestal turntables, two high-grade pickups and a changeover fader. If the purchaser so desires, the Mellaphone Co. will be glad to advise regarding amplifier needs. The Mellaphone is served by all leading producers.

New Ultratone Speaker at "National" Branches

The National Theatre Supply Co. announces exclusive distribution rights for the new Ultratone dynamic speaker, which has been designed and manufactured especially for sound motion picture work. The Ultratone may be seen at any one of the 31 National Theatre Supply Co. Branches.

25-Watt Capacity

Among the many features of this new dynamic unit are the use of a special moulded gypsum composition which tends to reduce to a minimum all vibration and

Give This to Your Friend—Have Him Fill It in and Mail to us at Once

The Motion Picture Projectionist
45 West 45th Street, New York City
Gentlemen:

Enclosed please find $1.50 for which you will enter my subscription to your paper for one year (12 issues) starting with ..... issue.

I was recommended to your paper by
Name .....
Local No. .....

Name .....
Street .....
City .....
I am a member of Local No. .....

distortion. Exceptionally heavy walls—at no point thinner than 1½"—clarify and round out the tones, with an absence of resonance and false tones. A bell spread of 98 degrees increases the range of the unit and permits rounded bass tones without distortion. The unit has a 25-watt capacity, which gives much greater volume than other and lower-wattage speakers.

Another important feature of this new product is its mounting on a special truck with ball bearing casters which greatly facilitates easy handling. The Ultratone is designed for use with any synchronous or non-synchronous instrument using No. 250 tubes or the following combination of push-pull output tubes: Two No. 170; two No. 210; one No. 250; two No. 250. It is made in two main models, one especially adapted for use with sound picture equipment, and one for outdoor or exhibition purposes where still greater volume is required.

West Coast A. P. S. Working On Technical Problems

Projectionists in Los Angeles and Hollywood are wrestling with a number of technical problems under sponsorship of Chapter 7 of the American Projection Society. About 90 projectionists in the Los Angeles area take part in the society's session, which begin at midnight after the members' work at theaters is over.

Cooperate with Academy

The projectionists will co-operate with the Academy of M. P. Arts and Sciences' survey of sound production problems now in progress in the studios, and will undertake an analysis of some of the problems most troublesome to projectionists. A standard tone level for recording is an important development toward which the studios are working. A standard proportion for the screen image to account for the distortion caused by the sound track on the film is also sought.

Boston Local Union School is Very Successful

Under the direction of Secretary James F. Burke, Local Union 182 of Boston has established a school for training its members in the various phases of sound picture work. The school has been successful far beyond the expectations of its organizers, and the Local 182 membership is supporting it to a man.

Demonstrate on Equipment

Special diagrams, layouts and plans have been prepared for the school, and instructions are accompanied by actual demonstrations of the equipment which is under discussion. Regular sessions are held so that every member, irrespective of his working hours, may participate in the work of the school.

The Local 182 membership is enthusiastic about the school, and Secretary Burke's efforts are being rewarded with excellent attendance.

LEADING THE WAY

THE GREATEST CIRCUITS AND FINEST THEATRES NOW USE

WALKER SOUNDSCREEN
PATENT PENDING

AS STANDARD EQUIPMENT

IT Delivers

50% More Light

Sharper Definition

Perfect Sound

No Fadeaway

BRILLIANT PROJECTION WITH LOW INTENSITY

Write for Booklet and Sample

WALKER SCREEN CO.
85 - 35th STREET BROOKLYN, N. Y.

FOR PERFECT SOUND REPRODUCTION ON THE SCREEN ENCLOSE ALL PORTHOLES WITH

F. S. C.
Optical Crown Glass Plates
Plano-Plano

Will Not Distort Surfaces With Precision Polish

FISH-SCHURMAN CORPORATION
45 West 45th St. NEW YORK CITY
6346 Santa Monica Blvd. HOLLYWOOD, CALIF.

Your public knows
the difference in projection

PATRONS never talk about "distortion," "aberration" or "flatness of field." But they are quick to notice "eye-strain," "blurriness" or "clearer pictures." And even the feature film can't hold their enthusiastic patronage unless projection is of the finest type.

To obtain absolute assurance of best projection results, leading theatre operators now unhesitatingly recommend Cinephor lenses. For definition, flatness of field, illumination, sharp focus and contrast between black and white—Cinephors have proved their superiority in many comparative tests before experts in projection.

A note from you will bring full information about Cinephor lenses. Bausch & Lomb will gladly cooperate in solving your own projection problems. Bausch & Lomb Optical Co., 654 St. Paul St., Rochester, N. Y.

Bausch & Lomb
CINEPHOR
Projection Lenses for Motion Pictures

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LET the swift, sure keys of the Underwood Portable Typewriter free you from the drudgery of hand-writing.

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"Underwood, Elliott-Fisher, Sundstrand—Speed the World's Business"

Subscribe NOW!—At present low rate of $1.50 per Year

Keep Abreast of New Developments in Your Craft

Fox West Coast Theatres to Award Projection Medal

WITH the announcement by Harold B. Franklin, president and general manager of Fox West Coast Theatres, that a gold medal will be awarded to the projectionist on the circuit who delivers the best work over a period of time, the following comment appeared on the motion picture page of one of the Los Angeles dailies:

"I liked the picture all right, but the talking wasn't very clear!" How often we have heard that sentence from patrons of motion picture palaces, and how often we have wished we might go up to the speakers and explain that poor projection and careless attention of the projectionist was alone responsible.

Last week we devoted most of our editorial space to complaining of the improper manner which audible productions are being delivered to the public.

We learn since writing the article that Harold B. Franklin, president and general manager of the Fox West Coast theatre chain, has decided to reward theatre employes for perfect projection.

There will be two gold medals, one for projectionists and another for managers. To win them the pictures shown in these theatres will have to approach the 100 per cent mark in sound reproduction, clearness of screen projection. The projectionist must follow intelligently, the rise and fall of pitch of the voice that is speaking from the screen. A card index system is now being used by which the main office will be able to check the theatres and credit or debit the men in charge.

This certainly should improve the popularity of talking pictures. The main fault today is not lack of technique from the producing standpoint, but inexperienced men displaying the cinematic wares.

We congratulate Harold B. Franklin for his idea and the carrying out of such an award. If it doesn't keep the men in charge on their mental toes, then they

Scranton, Pa., Local 329 Holds Annual Outing

Attended by approximately 125 members and guests from Pittston and Wilkes-Barre, the first outing of Scranton local, No. 329, Motion Picture Operators, was enjoyed recently at Daleville. The affair proved very successful and delightful, the day being spent in sporting events and other games. The trip was made in buses and individual cars, a short parade around the central city preceding the journey over the mountains.

Moving pictures were taken of the cars and people arriving at the scene of the outing, and of highlights of the day's program, and the film will be shown at the next meeting of the local. Dancing was enjoyed during the afternoon and there were special games for the youngsters and prizes awarded to the winners. The operators from Pittston and Wilkes-Barre made creditable showings in the athletic competition.

Credit for the success of the picnic is due to following committeemen: George R. Miles, John DePeep, Samuel Kessler and Joseph Wynne.

"No Sound" Check on RCA Disc System

RCA Photophone, Inc., has issued the following instructions for checking their sound apparatus when no sound is produced with a record:

1. Are the switches and rheostats set correctly? Check against "Starting With Record."

2. "FILM-DISC" switch set wrong?

3. "FADING POTENTIOMETER" in the "OFF" position or set for wrong projector?

4. Pickup defective? Rub the needle with the finger. Try a new pickup.

5. Voltage amplifier defective? Inspect the voltage amplifier for defective tubes.

6. Power amplifier defective? If the individual fuses of the power amplifier are blown, replace them at once. If the places of the rectifier tubes (UX-281) get real hot, turn the "POWER AMPLIFIER" switch "OFF".

7. Power amplifier a-c. Supply circuit defective—"PRIMARY VOLTAGE" meter on "O"? Replace the line fuses at once if they are blown. See that the converting equipment (if used) is running.

8. Are loudspeakers plugged in on the stage?

9. Short circuit on the storage battery line-pilot lamp and voltage amplifier tubes out? Change to the other storage battery. Inspect the fuses of the 4-p., d-t. switch. If blown, test for the location of the short circuit as follows: Turn the "BATTERY" switch "OFF" and disconnect the plugs on the input control panel. Insert new fuses in the 4-p., d-t. switch. Turn the "BATTERY" switch "ON" and reconnect the plugs on the input control panel one at a time. The trouble is in the part of the circuit which blows the fuses when connected. Operate without this part of the circuit if possible.

should be dismissed immediately, to be replaced by willing hands who seek advancement in a newly important branch of celluloid and sound technicians.

The theatre, too, which gains the reputation for the best sound reproducing apparatus will show profits at the box-office, while the careless manager, who permits his projectionist to loaf on the job, will suffer with a series of figures on the "red" side of the house ledger.

The writer of the above is to be commended for his zeal in trying to better the quality of sound reproduction, but his remarks indicate that he belongs to that group of critics who know nothing about sound equipment and who would be quite lost were they suddenly thrust in a projection room and told to go ahead and put on a show.

Lamp Sales in 1928

During the year 1928, 312,000,000 large and 228,370,000 miniature tungsten lamps were sold in the United States, according to a serial report of the National Lamp Committee of the National Electric Light Association. In addition there were sold 9,900,000 large and 26,565,000 miniature carbon lamps.

The total sales of large carbon lamps have been steadily decreasing during the past three years due to the decrease in importations. Most of the imported carbon lamps have been sold through the chain stores, which are now selling tungsten filament lamps in greatly increasing numbers.

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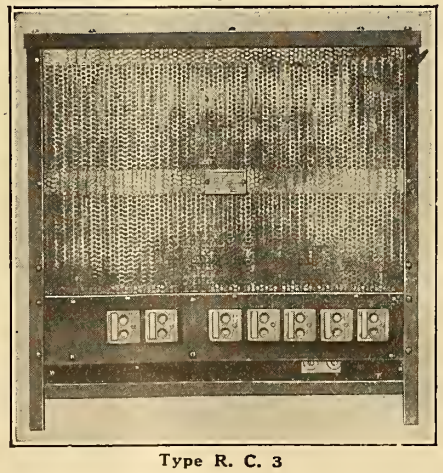
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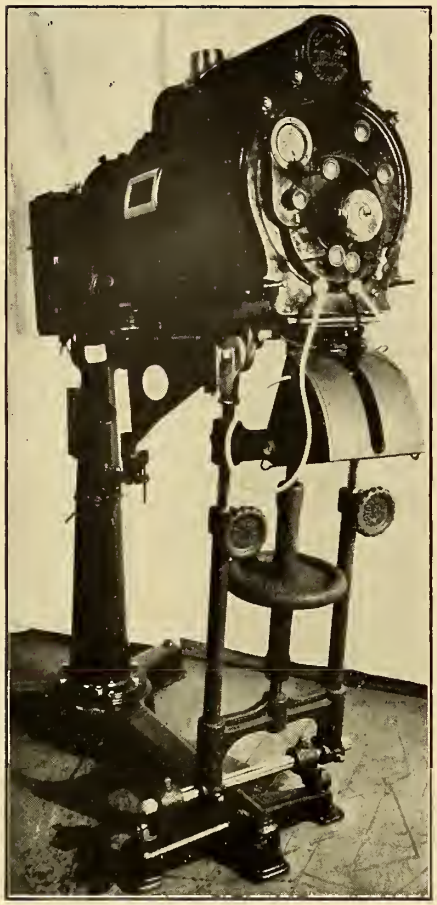
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W. E. System Operating Outline

THE following brief directions are only intended to cover the main points in the operation of the Western Electric Sound Projector System installed in the theatre, so as to assist you in remembering the various requirements. Make yourself familiar with the details by reading the Operating Instruction Book supplied, and if anything is not clear to you, consult the Electrical Research Products engineer who visits the theatre.

1. Start up the equipment half an hour before each show.
2. Every day before the show, test each horn individually by listening in the theatre, and see that all function properly.
3. Be sure that the horn safety switch is closed. Keep it closed at all times while the sound projector equipment is in use, including intervals when voice or music is not being reproduced. When shutting off the horns after the show is over, always open this switch *before* operating the horn battery switch at the battery panel.
4. If the apparatus fails to operate—for example, the motor does not start, the charger fails to give current, the tubes do not light, or the horns do not respond, etc.—see that all necessary switches are closed and that no fuses have blown.
5. Keep the machines well oiled but do not flood them. Apply a drop or two *daily* at every oiling point—this is far better than squirting on a lot of oil at long intervals.
6. Keep all parts of the machines clean and free from excessive oil. If equipped for using sound film (Movietone), after every reel wipe off the aperture plate and tension pad of the attachment, so that no accumulation of dirt or emulsion can form. When running sound films make especially sure that no such accumulations form in the sound track aperture of the plate, or tension pad. Use a pipe cleaner.
7. Keep the film clean and free from oil. Clean it by drawing it slowly and gently through a soft flannel pad. Do not rub the film hard and do not use chemicals or "dope" on it.
8. If using disc records, keep them clean. Every time, before one is played, dust it off with the cleaner provided for that purpose. Use a new needle for every record.
9. Keep the batteries well charged and do not let them get exhausted. If two sets of batteries are provided use them alternately, putting one set on charge while the other is in operation. Where there is only one set of batteries, keep it on charge for a period equal to the total time it has been operating since the last charge. BE SURE TO READ THE BATTERY GRAVITY DAILY WITH THE HYDROMETER. RECHARGE A BATTERY WHEN THE GRAVITY GETS DOWN BETWEEN 1190 AND 1200, AND CONTINUE THE CHARGE UNTIL THE GRAVITY IS UP AROUND 1270 TO 1285. (These gravity figures apply only to Exide batteries.)
10. When taking readings on the batteries with the hydrometer, change the pilot cell once every month so that there will be no drain on one particular cell.
11. Keep the batteries clean; do not let any of the solution drip on them. Keep the terminals coated with the grease provided.
12. Keep all spare equipment handy, so that you can make replacements without delay, in case trouble occurs during the show.
13. Do not make voices or music too loud. Keep feature accompaniments fairly soft. In newsreel work see that more volume is used for the voice of a close-up speaker than for a person some distance off. If necessary, also bring up the volume where it is appropriate to special effects, such as the shouting of a crowd, the whistle of a locomotive, a brass band passing near-by, etc.
14. Always keep the fader at zero when the power is turned on, except during the periods when voice or music is actually being reproduced.

Theatre Acoustics

ACOUSTIC conditions cause theatres to differ greatly in respect to the results obtained when loud speaking horns are operated at the stage. Some houses give a mellow, satisfactory effect, others make the reproduced sound appear metallic or hollow, and others tend to emphasize record and film noise. The shape and size of the interior make little difference, but the nature of the surface of the walls, ceiling, floor, or other extensive areas has an important bearing.

If these surfaces are hard and smooth—like, for example, plaster, concrete, brick, polished wood, or glass they will reflect most of the sound striking them. This constitutes an echo. Different frequencies are usually reflected in differing degrees. On the other hand, there are surfaces which are soft and thick, like stage drapes, heavy curtains, thick carpets, upholstered theatre chairs, or the bodies and clothing of an audience; there are also surfaces which are much broken up, like a plaster wall elaborately decorated with pilasters, moldings, cornices, coffering, etc. Surfaces of these kinds will absorb or disperse sound waves and damp them out very quickly. Here again different frequencies are usually affected in differing degrees.

Resonance and Reverberation

When an interior consists largely of surfaces of the first type—that is, has insufficient damping—a sound wave is reflected from one surface to another many times before it finally becomes inaudible. Hence sounds echo repeatedly and become unduly prolonged, so that in the case of speech or music one note or word will overlap the beginning of the next, causing a general effect of noise and indistinctness. This is called reverberation.

On the other hand, too much area consisting of surfaces of the second type—that is, excessive damping—causes a house to seem dead and dull, and such an interior is hard to fill.

Another factor occasionally encountered is resonance. This occurs with a surface consisting of some thin, hard material which is free to vibrate as a diaphragm at its own natural frequency. When sounds of that frequency strike such a surface, the latter vibrates and reinforces the sound. In the neighborhood of a resonant surface, therefore, any voice or music tones that happen to strike the resonant pitch will be unduly emphasized, and will seem louder than the other tones. Wooden panels, for example, may act in this manner.

The three effects just mentioned—reflection, absorption and resonance—give rise to complex phenomena of frequency selection and wave interference which are responsible for the differences that are often found in the volume and quality of sound heard from the stage in different parts of the house.

Typical Theatre Conditions

The following are some special acoustic conditions particularly characteristic of theatres.

1. Large, flat, unbroken wall and ceiling areas are often objectionable through causing echoes and reverberations, especially when there is such a wall at the back of an auditorium.

2. Windows or windbreaks, particularly large smooth panes of glass as installed in the rear of orchestra seats, may cause troublesome reflections.

3. Deep shafts and wells (as over the orchestra lobby of a theatre), may introduce local reverberations.

4. Extensive domes may cause concentrated or focused reflection.

5. Grilles in themselves are not objectionable, but the walls behind them may give trouble.

6. Crystal chandeliers, loose metal plates, or such like objects may vibrate and give off harsh noises.

7. There is often objectionable noise from fans, street cars and other inside or outside sources.

Speaking in terms of the various factors that have just been discussed, it can be laid down as a general rule that a good theatre interior from an acoustic standpoint is one which has conditions intermediate between the extremes of too much reverberation and too much damping, this state being reached by a suitable combination of reflecting surface, broken-up surface, and absorbent surface. Some resonance may also be desirable.

It is, of course, essential that there be none of the negative factors already mentioned under headings 1 to 7, nor should there be any combination of acoustic factors which results in local dead spots, loud spots, or distortions of quality.

Improved Construction

It may be noted here that the draperies and elaborately moulded decorations found in most theatres are partly intended to assist in providing the right degree of damping, and that within the last few years admirable results in this direction have also been obtained in many important buildings by using for the interior surfaces special sound-absorbing types of plaster, art stone, brick, etc., which are available in various commercial forms.

It is important to note that owing to absorption by the audience a theatre is always much less reverberant when filled then when empty. Also, owing to the same phenomenon, two or three times the power is necessary to produce a given sensation of loudness in a full theatre as compared with the same house empty.

Practically all ordinary building materials belong to the class of sound reflectors rather than sound absorbents. For this reason when acoustics are unsatisfactory it is usually found that excessive reverberation is the principal cause of trouble. When the only available source of sound in such a case is the unaided voice or unaided musical instruments, efforts at improvement must usually take the form of increasing the damping by providing additional absorbent surfaces.

The audience, as before mentioned, is highly effective in absorbing sound, and therefore even if the theatre or hall is quite reverberant there is little opportunity for sound to reach hard surfaces and set up reverberation.

Audience Absorbs Sound.

While, as already stated, it is not often desirable to add damping material at any point in the auditorium, in most cases it is very important to provide for damping the stage. This is because no matter how good acoustic conditions may be in the auditorium, the stage with its bare walls and hard floor is usually reverberant, and while the directional characteristics of the horns prevent much sound going back over the stage, enough may go to set up very objectionable reverberations.

Another reason for stage damping is that if the auditorium itself is inclined to be reverberant the absorbent material draped on the stage will aid quite materially in reducing this condition, for in a reverberant interior it is not always essential for the absorbent material to be placed directly on the reflecting surfaces, but it will be largely effective no matter where it is located. Conversely, a reverberant stage may spoil the acoustics in a house where the auditorium itself is sufficiently damped.

From what has been said it will, of course, be apparent that sounding boards and such like devices supposed to help the speaker are unnecessary, and in fact are objectionable, as they may introduce confusing acoustic factors. They should, therefore, be removed whenever possible.

Telephone Has 201 Parts

An ordinary desk telephone set, which apparently consists of only a receiver and transmitter, when taken apart will be found to have no less than 201 parts. One hundred and fourteen of these, however, are small, consisting of nuts, screws, washers, bushings, insulators, etc., while the remaining 87 are those parts which are held together by the smaller units. All of these parts must be made so nearly alike that they will go into their respective places without any additional fitting.

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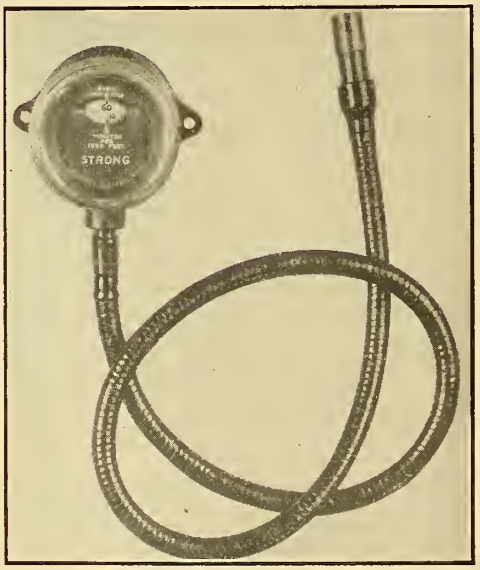
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Paramount Demonstrates Wide Film Process—Magnafilm

THE Magnascope, which employs a lens arrangement to secure a wide picture and which was effectively used for the first time in sequences of "Old Ironsides," is now being used extensively throughout the Publix Circuit for organ slide presentations. The Magnascope was described in these columns by Harry Rubin, Supervisor of Projection for Publix Theatres Corp., who developed the idea for Publix.

Paramount has demonstrated in a New York theatre a new wide film process which is to be known as the Magnafilm which projects a picture 20 feet high and 40 feet wide. Although work on this process has been under way for the past two years, it is believed that Paramount's recent demonstration was in the nature of keeping in step with RCA Photophone, Inc., which recently demonstrated its Spoor-Berggren wide film system, described in the June issue of THE MOTION PICTURE PROJECTIONIST.

Easily Attached to Projector

Magnafilm has been developed by Lorenzo Del Riccio in conjunction with Paramount technicians at the Astoria, L. I., N. Y., studios in co-operation with studio workers on the West Coast. Del Riccio was well along with the process when sound pictures were introduced, thus requiring an altogether new line of approach to the problem. Dimensions of the Magnafilm stock are 56 mm. wide by 19½ mm. high.

Magnafilm does not require new projectors but simply an attachment which can be put on any standard projector in a few minutes and can be adjusted to throw a picture on the screen which will meet the special requirements of the individual theatre. Magnafilm will be described in detail in these columns in an early issue.

Proper Handling of Discs Insures Perfect Show

For the successful performance the utmost care and attention in the handling of disc records is required. All discs should be carefully checked upon arrival. Make certain that the number on each disc corresponds to number on film and that the shipment of disc is complete.

Make certain that the required number of duplicates are also on hand. Disc records should not be placed near anything warm, and should be laid flat to prevent warping.

Disc Holes and Scratches

Do not place any tools or other materials on the projection machines, turntables or bases. They are liable to fall on the disc and mar or break the record.

Examine records carefully under magnifying glass for holes and scratches. If any are discovered, discard the record. Remember that all records or pieces of same, regardless of condition, are to be returned to the distributor.

A New Scientific "Eye" That Matches Hues

THE matching of colors no longer need be a matter of guesswork, for the Bausch & Lomb Optical Co. announces its perfection of the spectrophotometer, a light measuring instrument for the standardization of colors. An auto firm, for example, specializes in cars of a distinctive and attractive hue. It sends a sample of the paint to a paint factory and orders a new supply.

A matcher at the factory may not feel quite well, or he may be moody and, as he depends on the naked eye, his physical or mental disturbances may result in a batch of paint that is not of the required shade. The matcher guesses at what ingredient may be missing. He tries to build up the batch to the stipulated shade, uncertain what quantities and what colors to add.

This grouping is often repeated many times, with a loss of time, labor and materials.

By the use of the spectroscope and a photometer it measures the light in every wave length of the spectrum, or color scale, and this measurement is transferred to a chart which covers the entire spectrum.

A study of the chart, which translates colors into precise numerals accurately reveals what pigments are required to get a specific shade. Such charts become the color standards for all time for both liquids and solids.

The spectrophotometer is expected to have a tremendous appeal for the textile trades. If a manufacturer of a house dress, say, wishes to guarantee that it will not fade, he may make washing tests at his factory.

If the colors fade, examination of the material by the spectrophotometer will point out the weakness of the dyes and the measurement chart will suggest the proper remedy.

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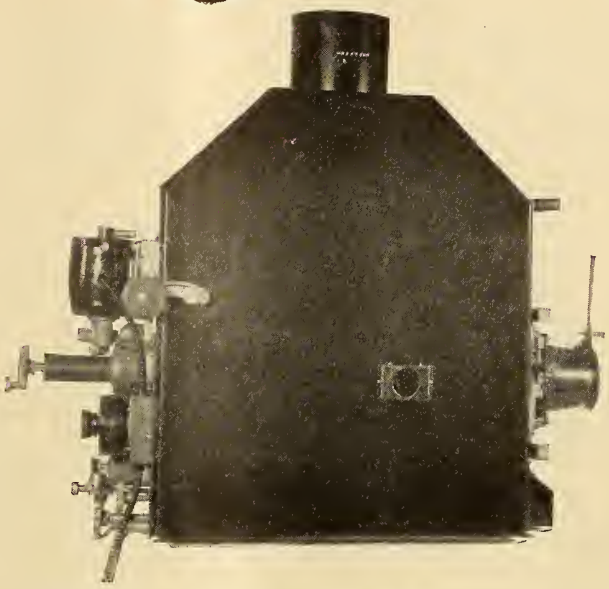
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Order Sentry Device in All Penna. Theatres

The Sentry Safety Control, fire-prevention device, is now required in all Pennsylvania theatres as a result of an order issued recently by the Industries Board of the State Department of Labor and Industries. All theatres in Pennsylvania must be equipped with the device not later than February 16, 1930.

The report of the Industries Board did not specifically mention the Sentry Safety Control as the one to be installed, but since this is the only such device which has the Board's approval for efficient fire-prevention, only the Sentry device will be installed.

900 Theatres Affected

This latest State action closely follows the order of the Philadelphia fire department to theatres there to install Sentry Safety Control. Most of the large houses in Scranton and Pittsburgh are already equipped with the device.

It is estimated that the Board's order will affect more than 900 Pennsylvania theatres.

Extreme Care Essential in Handling Sound Film

Surface noises are caused by dirt or scratches on the sound track of Movietone film. Such dirt may be due to dust gathered from the atmosphere, the latter caused by a dirty projection room floor which scuffs up under the action of the feet.

High Speed Rewinding

It also may be caused, in spots, by the handling of the film with dirty fingers. However, the greater proportion of the damage is caused by dust in the air which collects upon the film and in the process of high speed rewinding with attendant slippage of the layers of film rolls upon each other.

This dirt then is drawn across the sound lines, thus inflicting more or less minute scratches. Don't rewind at high speed. Don't pull down in rewinding. And keep your projection room as free as possible from dust accumulations.

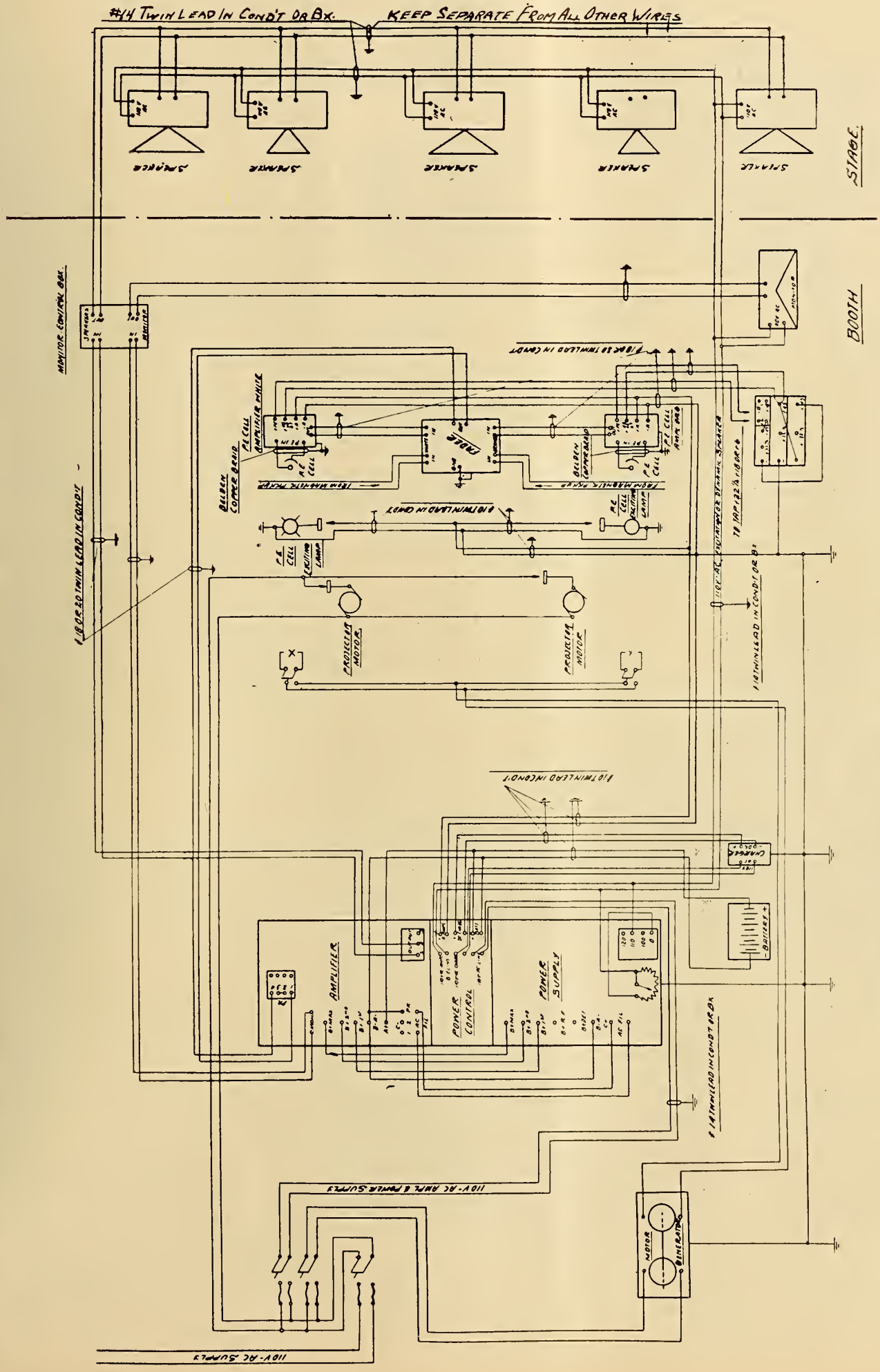
Never sweep the projection room floor while film is exposed.

Replacing Exciting Lamps

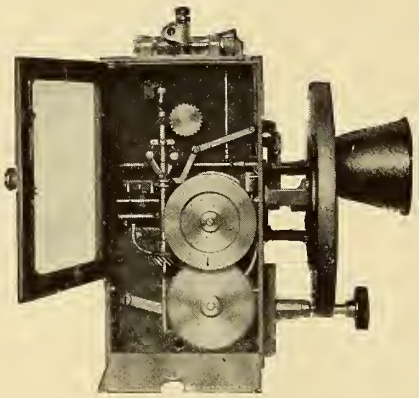
Always, it is well to discard exciting lamps just as soon as darkening of the interior wall of the bulb begins. Such discoloration operates to absorb light and therefore to reduce the amount sent forward to the slit.

This, of course, reduces the sound volume, though the effect it so gradual that you might not notice it if you depended upon hearing alone.

Such discoloration is the result of aging of the lamps. It is evidence that the lamp, whatever its age, has passed its age of usefulness. A new lamp should for best results be installed immediately.



General Layout for DeForest Phonofilm System



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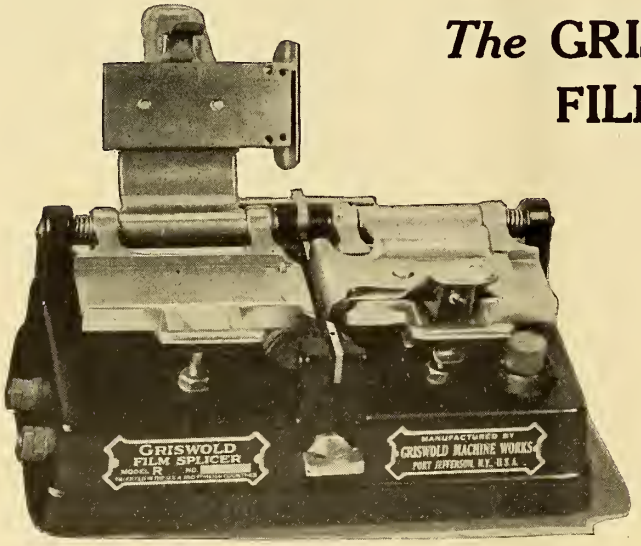
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Do It Now!

Local 306 Educational Societies Combine

The Kaplan Projection Society and the Manhattan Projection Society, educational groups of Local 306, New York City, have combined forces and will be known in future as the Kaplan Projection Society. Both societies have been very successful in the matter of sponsoring interesting demonstrations of and lectures on new equipment, practically the entire Local 306 membership having been enrolled in one or the other society.

Will Aid Lecture Periods

Heretofore Brooklyn 306 residents have enrolled with the Kaplan Projection Society and the New York City men with the Manhattan. Officers of both societies saw in the proposed merger a chance to include the entire Local membership in one large group, thus facilitating lecture and demonstration periods. The Kaplan Projection Society is the younger of the two, having been founded two years ago by Dave Pehar.

James Le Fante, Brooklyn B. A. is president of the combined group, and Dave Engel, Financial Secretary of Local 306, is vice-president.

Fish-Schurman Offers New Glass for Arc Lamps

A recent addition to the many types of optical glasses manufactured by the Schott & Gen works of Jena, Germany, is being distributed by their American agents, Fish-Schurman Corp. of New York City and Hollywood, Calif. This new glass is used for a peephole for arc lamp windows. It is homogeneous and of such opacity that in its single thickness it retards the harmful glare of the arc and makes it easier for the projectionist to view the burning crater.

Low Linear Coefficient

This glass has a very low linear coefficient of expansion which makes it extremely heat-resisting without fear of breakage. Fish-Schurman also distribute the S. O. G. "Ignal" condensers, F. S. C. optical "Crown" glass plates for portholes, F. S. C. reflectors and other optical glass specialties.

Stars' Heat Measured

The heat of stars is now measured at Mount Wilson Observatory with a 100-inch telescope equipped with an instrument made from the wings of a house fly. So delicate are the instruments that the wings of a single fly are sufficient to make a dozen such instruments.

Edison Rubber Researches

Thomas A. Edison, who recently participated in the fiftieth anniversary celebration of his discovery of the incandescent lamp, has announced that he will devote the remainder of his life to experiments with the rubber plant, a subject on which he has already spent two years.

Procedure for Removing Oil and Dirt from Film

IF for any reason a surplus of oil accumulates on the projector it is quite likely that some will fall on the film, and tend to hold any dust or dirt that may come in contact with it. This oil and dirt may deposit around sprockets, in the idlers, in the film track, and at the aperture opening, and may interfere with perfect projection or damage the film itself. There are several simple film cleaners on the market that may be bought at small cost.

In the absence of a film cleaner, a soft lintless cloth held in contact with both surfaces of the film will serve very acceptably. It is quite important to use clean cloths frequently as old ones become soiled. If soiled cloths are used there is a likelihood that rain streaks will be produced. A stiff-bristled tooth brush may be used to remove dirt from the parts of the projector.

New film is said to be "green." In order that it will pass through the projector satisfactorily, the film must be waxed. When a new film is projected, if it is not waxed, an accumulation gathers on the tension shoes immediately in front of the aperture, and on other surfaces. This substance becomes very hard and difficult to remove. It may be removed by using alcohol as a solvent, or scraping the accumulation away with a coin. Never use a knife because steel will scratch the surfaces. Dirt deposits, scratches, and dirt all tend to injure the film. The photographic quality may not be injured but the film surrounding the sprocket holes may be scratched quite badly.

Causes of Bad Film

The following contribute to rapid film deterioration and subsequent projection difficulties:

Dirt accumulations.
Worn sprocket teeth.
Too strong tension.
Poorly adjusted idlers.
Misalignment of working parts.
Surplus of oil and grit.
Accumulation of loose emulsion and wax.
Careless rewinding, packing, shipping and storing.

Fox "Widescope" to Be Ready for Fall Showing

The Fox Film Corp. is pushing work on its new wide film process and it is understood that the first public showing of Widescope will be given early in September. Special projectors for use with Widescope have been built by the International Projector Corp., which company is understood to have cooperated with Fox in the development of the process.

Widescope is the third entry in the wide film derby, both RCA and Paramount having already demonstrated their processes—the Spoor-Berggren and Magnafilm systems, respectively. A race to be the first to offer a complete wide film program at a Broadway house is now in progress between these companies.

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YOU men who are constantly on the lookout to establish goodwill might stop to ask yourselves, "Have I the goodwill of my own employees?" Theatre operation, like any other well-organized business, requires co-operative tactics and understanding between the manager and his different departments, all essential to proper management.

Keeping the cashier happy means smiles for every ticket sold. Keeping the doorman in good spirits means a pleasant "Good day" for every patron who hands him a ticket—and so on right down the line to the most unimportant member of the staff.

But there does exist one department of the theatre where goodwill and 100 per cent co-operation should be paramount at all times. That is the projection department.

In most instances, the projectionist of a theatre is a man above the average, and one who has worked hard to qualify himself for the particular type of work he is doing. Why not encourage him, show proper appreciation for a well-projected performance, for the many odds and ends he performs to make his job and his surroundings more workable?

We know of many managers who believe that if they "crab" at their projectionists for every little fault, that they are showing their authority and keeping the men on their toes continually.

The accompanying article headed "Goodwill, Like Charity, Begins at Home," appeared in a recent issue of *Motoin Picture News* under the Managers' Round Table department. This article is interesting from the projectionist's viewpoint in that it constitutes one more index of the increasing importance of the projectionist as a craftsman and the ever-increasing respect he is commanding today throughout the industry.

The article was written by C. L. Lewis, editor of the Managers' Round Table department in the *News*, who has been both a projectionist and a manager and who therefore knows well whereof he speaks, in co-operation with P. A. McGuire, advertising manager of International Projector Corp. and Chairman of the Projection Advisory Council.

Mr. Lewis's article attracted widespread attention and not a little comment in exhibition circles, particularly since it was so phrased as to indicate that goodwill, which is ever the alert manager's hobby, may be successfully practiced within as well as without the theatre.—The Editor.

I'm sorry to say that I don't agree with managers of that kind.

Rather seek for the opportunity of commending your projectionists for a show run without a flaw, for keeping their equipment in perfect condition, and for the many other things that a real projectionist is constantly doing for the house.

After all is said and done (and this has been said innumerable times), the projection room is the heart of the present-day theatre, and in it you have invested many thousands of dollars, plus the more recent expenditures for sound and talkies.

It's money in your pocket, plus many satisfied customers, if your show can be run perfectly and efficiently; so why seek to find fault when there are so many of the nicer things to be found?

It is not our intention to place the projectionists, or anybody, for that matter, on a pedestal, but we do most emphatically want to encourage co-operation between managers and their employees. It's an investment of common sense that will pay.

Think this one over, boys, and try to keep in mind that the goodwill of your entire staff—and especially your projectionists—will work wonders for the theatres and for yourselves, just as goodwill among the merchants and patrons works so many wonders for your box-office receipts.

Expansibility and Compressibility

Gases, unlike liquids, are easily reduced in volume by increasing the pressure under which they exist. This is evident from the quantity of air in the tire of an automobile; for example, it may be increased to double or triple the original mass. Again, the air in a pneumatic cushion is compressed into a smaller space when one sits upon it, but it springs back to its original volume when the pressure is relieved. Thus air and other gases manifest the property of expansibility as well as compressibility.

The pop gun and air rifle made use of these properties of air: First, the air is compressed in the cylinder of the gun, then as the pellet moves, the force of expansion drives the missile with great acceleration from the barrel.

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Ashland, June 19.—Two theatre projection-room operators were saved from being gased to death here today by prompt action of a spectator when a reel of film burst into flame in the booth of the new Roxy Theatre.

Robert Davis, chief operator, and Charles Rupp, his assistant, were the men saved.

Deputy Coroner Charles W. Sener, who effected the rescue, also was under a doctor's care. Davis is in a critical condition and was unconscious in the booth when Sener entered. Rupp also was in serious condition for a time. All three men breathed the fumes emitted by the burning film.

Physicians explained that the mixture of bromine silver, iodine and chloride gas which entered their lungs has dangerous effects, which are not always immediately effective.

When Sener, noting something wrong, pushed his way into the booth, he found Rupp groping about trying to find the door. The air was yellow with heavy gas. Davis was lying on the floor unconscious at the electric switchboard. Sener and Rupp carried Davis to the roof, then returned to extinguish the fire.

When the blaze was out, they turned to go back to the roof and found Davis lying on the floor of the booth in front of the switchboard, again unconscious. Revived by the air on the roof, he had returned to the booth and collapsed after throwing on the house lights.

Clipping from THE PUBLIC LEDGER, *June 20th,* 1929.

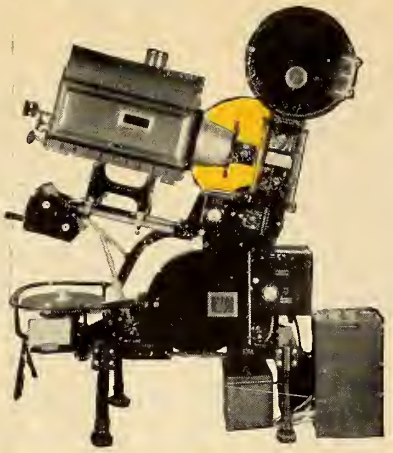
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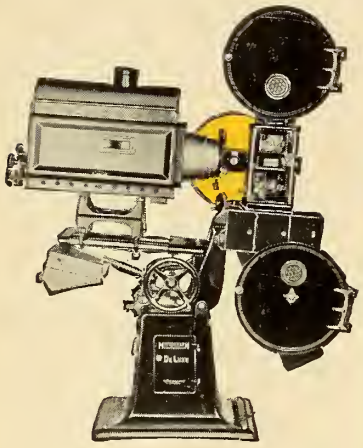
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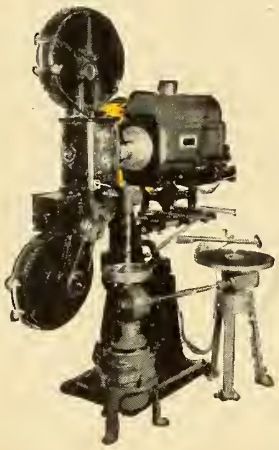


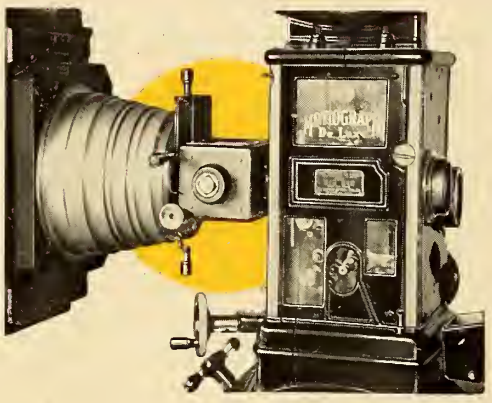
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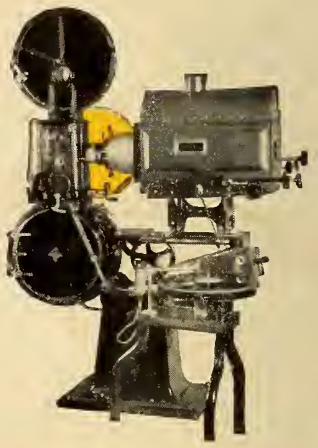
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September 1929

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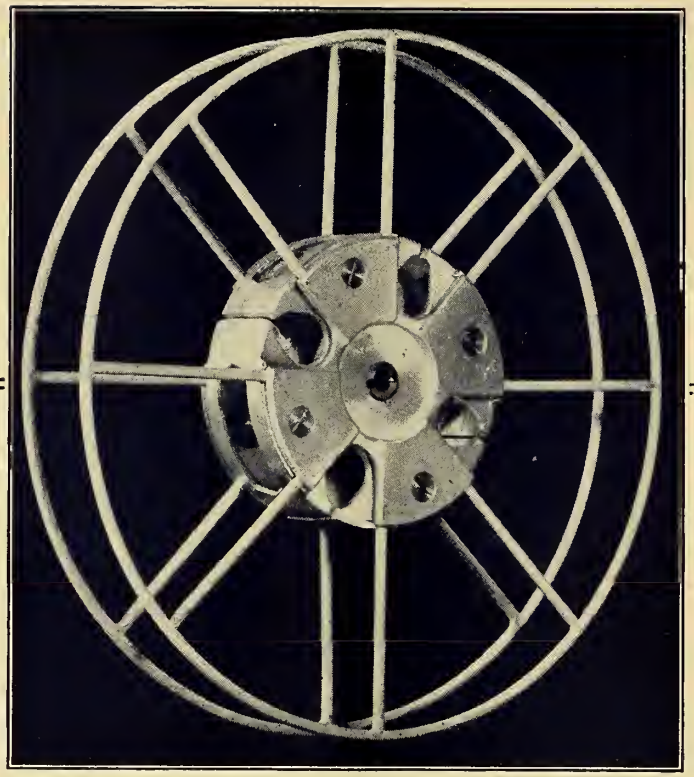
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Projection Engineering, the new technical journal of the Sound and Light Projection Industries, occupies a prominent position in the "new industries" publication group. The editorial contents cover the engineering, industrial and technical developments in the rapidly growing fields of

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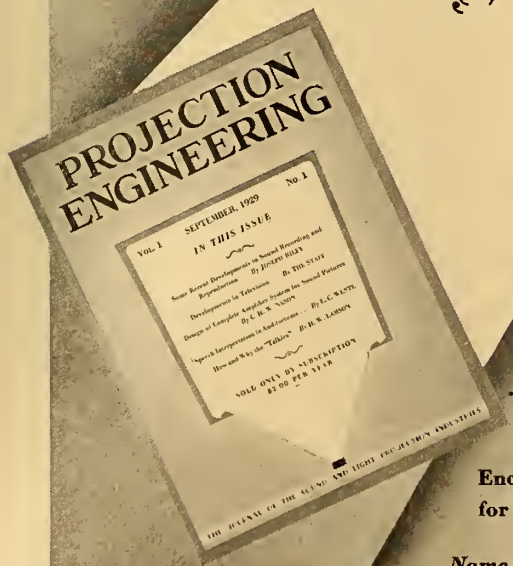
"The Journal of the Sound and Light Projection Industries"

Projection Engineering is published by the Bryan Davis Publishing Co., Inc., who also publish Radio Engineering and Aviation Engineering.

The editorial staff of *Projection Engineering* is headed by M. L. Muhleman, for years editor of Radio Engineering with Austin C. Lescarboura, Donald McNicol and John F. Rider as associates.

The first issue (September, 1929) will carry the following material—

Recent Developments in Sound Recording and Reproduction *by Joseph Riley*
Television Developments *by M. L. Muhleman*
Design of Complete Amplifier System for Sound Pictures . *by C. H. W. Nason*
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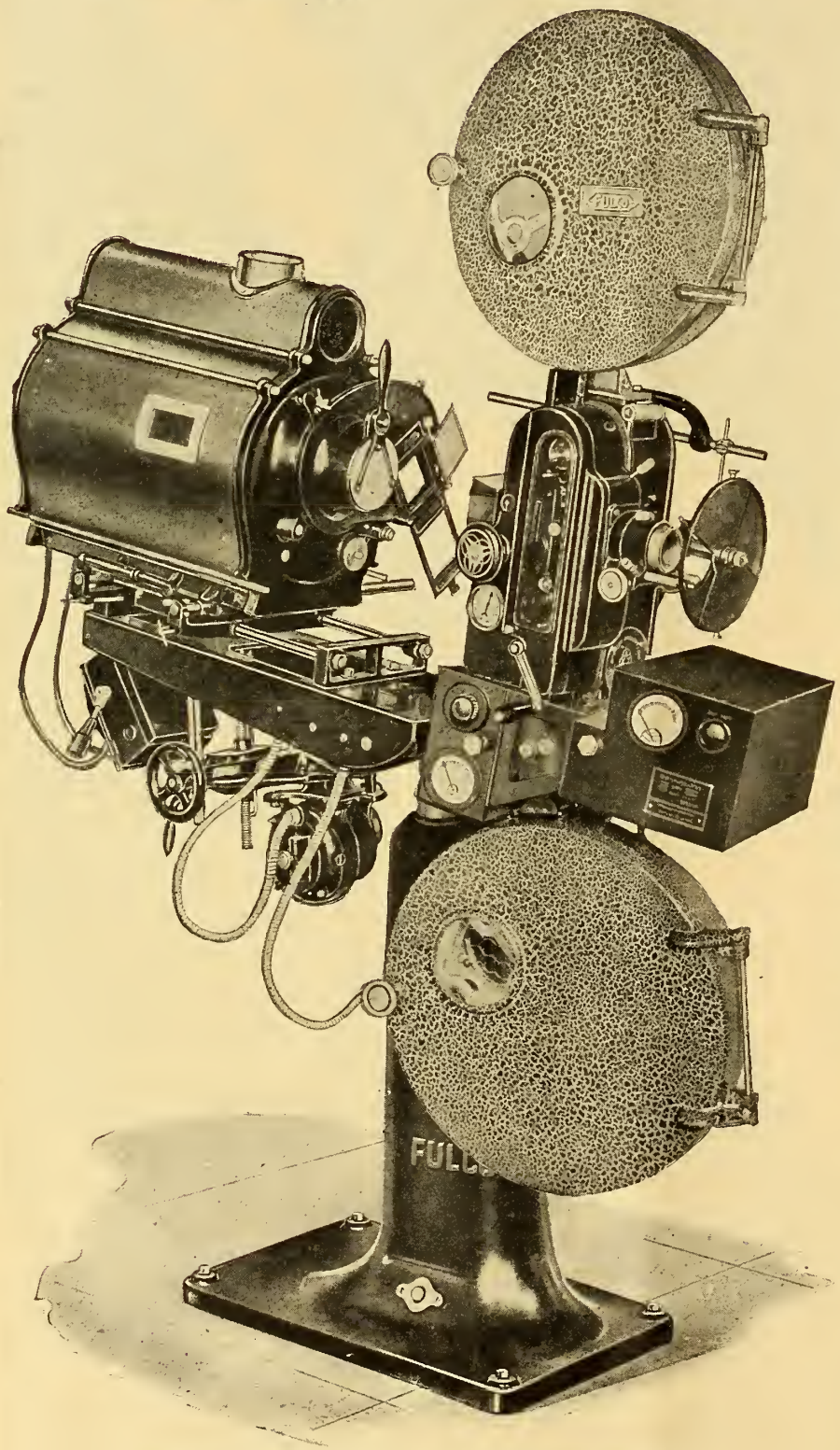
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A. F. of L. Executive Council Meets at Atlantic City

THE executive council of the American Federation of Labor has been in session at Atlantic City, N. J., during the past week preparing a report of the year's activities which will be presented to the annual convention to be held at Toronto, Canada, in October. Preceding the meeting President Green said that the detailed report will show the fact that there have been no important wage decreases throughout the United States during the past year, and that the Federation has gained considerably in the way of membership.

Five-Day Week Progress

As to the five-day week, Mr. Green said that the collected reports of its adoption during the year indicate about 500,000 added to the existing total of persons who work five days out of seven. He pointed out, however, that this figure of 500,000 represents only the known addition to the existing total and does not include the unreported additions, which make the present total of five-day week employes a matter of guesswork.

Unemployment, Mr. Green said, seems to be restricted to small towns rather than cities, and the total of unemployed does not seem to be unusually large. It is difficult, however, he said, to decide whether it is above or below normal unemployment, because there has never been any determination, or even a good approximation, of what normal unemployment might be.

Gompers Memorial Plans

The council will also decide the form of a new bill, replacing the Shipstead bill killed by the Judiciary Committee of the last Senate, restricting the use of injunctions in labor disputes.

Further, the council will constitute itself an art jury to decide which of a half-dozen plaster models of a $125,000 monument to Samuel Gompers is most worthy of his memory.

To Seek Electrician In All Denver Theatres

Certain interests in Denver, Colorado, are very actively supporting a movement to enact a municipal ordinance which, if passed by the city council, would require an electrician in every theatre which uses electrical appliances. The term "electrical appliances" includes, of course, lighting swithes and the like, which would bring under control of the ordinance every theatre in Denver. In addition, the electricians would become eligible for membership in the Denver Amusement Council, which now includes projectionists, musicians and stagehands, and would thus be in a position to influence the policies of that body.

Abservers in Denver say that the ordinance probably will never be reported out by the aldermanic committee and stands small chance of adoption.



A scene from "Our Dancing Daughters" starring Joan Crawford— a Metro-Goldwyn-Mayer picture

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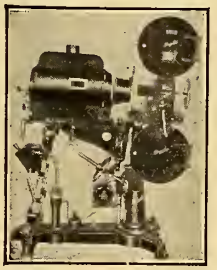
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Special Equipment for Sound Pictures

I. The Photo Electric Cell

By D. E. REPLOGLE

IN all new arts, minor improvement and service consideration must be subordinated to the perfection or workability of the whole device, so engineers take from here and there ideas and apparatus which, when assembled, complete the whole. Often the apparatus as used is not always the most suited but is the best obtainable at the time. This has been true of this very thriving sound picture industry. When at first the sound was recorded on records, immediate recourse was made to the phonograph recording art, and the first recorders were made that way. Later it was discovered that various improvements were necessary. The record must be larger and heavier, they must be more carefully made . . . and so it went until now this development is well advanced.

Later it was found that photographing sound on the film itself was more desirable provided only the quality of reproduction was as good as that obtainable from the disc. Immediately there was a scramble to use all the engineers and materials available for design and construction, pick-up devices and amplifiers suitable for the work.

Improved Cell Demanded

It was, of course, necessary to use a photo electric cell as the pick-up. What was available? Only various large size cells that were being used for television experiments and commecial uses where it was desirable to control operations by change in light—usually daylight. It soon became apparent that for the sound picture only a very small area of light could be utilized, and so small a photo electric cell would not only serve the purpose as well but save room and be less microphonic than the larger size.

Figures 1 and 2 show two small-sized photo electric cells especially designed for sound picture pick-ups. The size of the 3G5M cell is the same as that of a 199 tube; and the size of the 3GM cell is the same as the 201-A tube. While smaller cells can be made, it has been found that these are the most suitable sizes.

Again it was most convenient to bring both anode and cathode leads out through the same stem; and little attention was given to the capacity between leads, which may easily become large enough to by-pass a lot of high frequencies so essential to quality reproduction. Also, if the leads of the photo electric cell come out together, there is a tendency for the designing engineer to run the leads twisted together, from the cell to the amplifier.

This still further increases the capacity, which is detrimental to quality, and, in addition, permits leakage to take place between wires or across the terminal on the socket. Of course, the use of high-grade insulated wire and high-grade sockets will greatly decrease the possibility of leakage trouble, which is noted in the installation by the presence of crackling sounds.

A little study of possible terminal arrangement shows that by putting the cathode terminal on top of the photo electric cell bulb, much of this possible difficulty can be eliminated. Capacity effects are greatly reduced in the leads inside the cell and also in the connecting wires. Leakage is also reduced, being absolutely eliminated in the socket and by separation of the terminals that thorugh the insulation of connecting wires is minimized. It is details like these that are assuming greater proportions as the development of the sound picture progresses.

Sensitivity Requirements

Again, photo electric cells of the unusual type developed for commercial and television uses have a response curve like No. 1 in Fig. 3. This curve shows that the response is maximum, or 100%, on the graph when the light is of very short wave length in the blue and violet end of the visible spectrum.



Fig. 1



Fig. 2

Unfortunately, the light to excite the photo electric cell used in sound picture equipment must first filter through a film, which cuts off most of the blue and violet generated in the exciter lamp, with the result that what light does get through is more of the green and yellow part of the spectrum. With some of the new types of film being used, which is claimed to give great depth of picture, the light that filters through is still longer in length, being in the yellow and orange part of the spectrum.

Again referring to Fig. 3, from curve No. 1 it is seen that green light affects the average photo electric cell only 15 per cent of its maximum response, yellow only 3 per cent, and orange light only 1.5 per cent. So it is evident that special cells are required to work most efficiently, as in present installations they perform at only from 1.5 per cent to 15 per cent of the possible maximum efficiency.

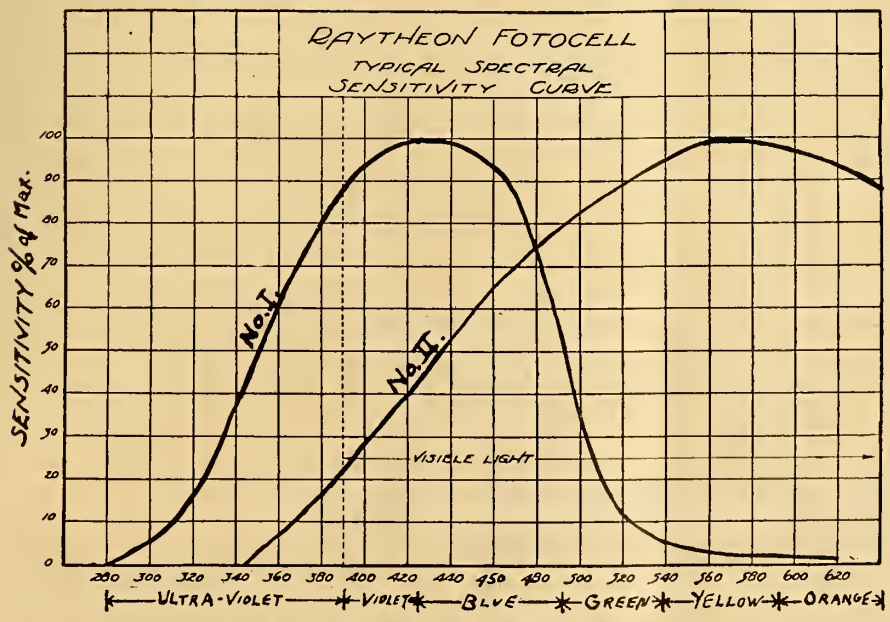


Fig. 3. Response curve of Raytheon cell

Means of Improvement

It is obvious that there are two ways to improve the photo electric cell for sound picture work. The first is to increase the sensitivity of the usual product so that the response in current flow will be greater for any given light values. Second, by changing the light frequency response curve to more nearly approach the ideal curve for sound picture work. Such a curve is shown in No. 2 in Fig. 3. Such a cell would give its greatest response in the yellow region where the light through the film has the greatest strength. This

(*Continued on page 27*)

Wide Image on Standard Film

By CAPT. RALPH G. FEAR
Cinema Equipment Co., Hollywood

WITHOUT doubt, the present size image in the motion picture industry is going to be changed. For years the standard dimensions of the motion picture film has been 3/4 by 1 inch. This is projected on the screen through a machine which decreases the picture size to about 45/64 by 15/16 of an inch. It is then enlarged during projection. Since the advent of talking pictures the picture has been decreased in width until it is almost square. Due to this small image enormous light intensity is required under great amplification and film grain shows.

A change is surely coming. The change will be for a larger image. An image that is much wider than the standard width of the present. There are many attempts being made, and wide pictures are going to be the rule of the future.

I have devised a method which I feel is to be the one of the future. By my method I can produce a picture twice as wide as the present standard image, and can produce it on *standard size* film. In addition to making a picture on standard film twice as wide as the present one, the sound track on my method will be twice as long as that of the standard picture, and a stereoscopic illusion will be given that approximates natural vision.

Radical Changes Unnecessary

But the outstanding feature of my method, in my opinion, is the fact that while it gives a picture twice as wide as the standard, and gives a sound track twice as long, it requires no new equipment either in the laboratory, theatre or studio. Only an optical unit and an alteration in gears and sprockets need be added to a standard camera to photograph the pictures, and only an optical unit plus a change of gears need be added to a standard projecting machine to make it possible to project the wide image.

In this way an untold amount of money can be saved everyone connected with the making and showing of the pictures, for under the new methods advanced by others, every bit of equipment used from the making of the film to the showing of the finished picture would have to be changed and replaced, with a cost that conservatively would run into millions of dollars. With my system only a slight change is necessary in the camera and projector and the saving is apparent. By reason of this, producers can go into production almost immediately with my system, and will not have to wait months for new equipment.

The accompanying article "Wide Image on Standard Film" presents another aspect of the now general movement within the industry to supplant the standard size film with a new and larger size which will permit a wider latitude for the presentation of scene and sound. Capt. Fear's article in a recent issue of *American Cinematographer* attracted widespread attention and comment.

—The Editor.

Advantages of System

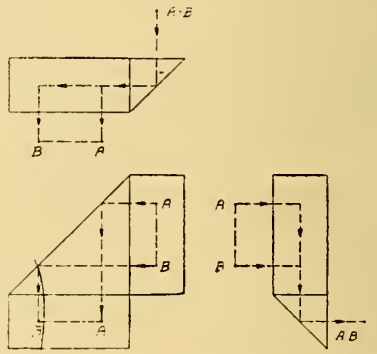
The chief points of my new method are as follows:

1. It gives larger picture on standard film.
2. Gives a more natural picture on the screen because it more nearly approaches the normal angles seen by the human eye.
3. Gives a wider sound track for recording sound photographically on film, which improves sound record.
4. Gives a sound track approximately twice as long as the present sound track, therefore giving greater sensitivity in recording, because with present light valves the sound record for each vibration is twice as long.
5. Broadens the sound recording scope by giving increased length for recording, thus allowing recording of twice the present frequencies now recorded.
6. Can be projected through standard projectors now in use.
7. Can be printed on standard printers.
8. Standard reels used, also standard developing machines, waxing machines, polishing machines, speed and footage indicators and standard camera magazines.
9. Can be projected in any theatre having present equipment when only a slight alteration is made to projector, and standard cameras can be used with slight alteration.
10. Does not require alteration of present sound equipment.
11. Eliminates so-called "grain" in film, and no trouble with curling, together with comparative freedom from scratches.
12. All of the equipment now in use in studios, laboratories and theatres can be used with only slight alterations to cameras and projectors.

I get my wide image on standard size film simply by using an optical system in the camera which places the image lengthwise on the film instead of across as is the present system. In this way I can get the desired width without using a wider film as the optical system is arranged so that the picture is thrown on the film to the desired width. Another optical system on the projector projects the image on the screen normally and there is the wide image from the standard size film with no added expense of new equipment.

Horizontal Aperture Path

The pictures are taken upon a standard motion picture film and are approximately .800 of an inch high and 1.813 inches long.



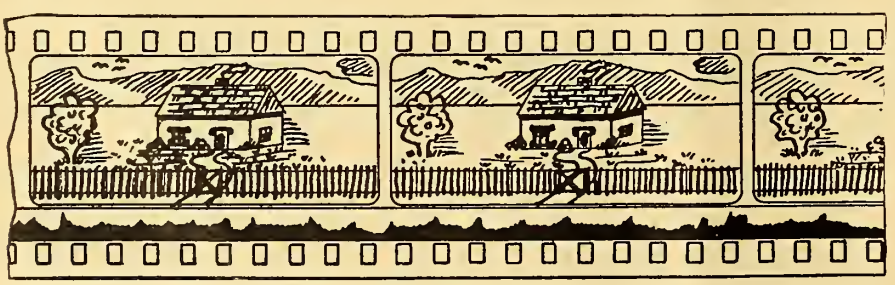
Optical system for projector. This may also be used on camera

The film track is approximately .200 of an inch wide and is on the edge of the film. The picture is photographed, either in a vertical plane by use of an optical system that turns the image through an arc of 90 degrees and places it parallel to the edge of the film, or it may be photographed directly upon the film without the use of the optical system. In the latter case the film runs horizontally past the aperture.

I have applied for patents on all phases of this new method; the method of photography, the film with the combination of a sound track and rectangular picture with the top of the picture parallel with the edge of the film; for a camera suitable for photographing these pictures; for the method of turning the picture optically from a vertical to a horizontal position for projection; and on the combination of the optical system and projector necessary for turning the picture from the vertical to the horizontal plane.

One of the main objections to the present size picture is the fact that it has lost, in a large measure, the quality of naturalness. Normal vision subtends an angle that is approximately twice as wide as it

(*Continued on page* 31)



Wide image on standard film. Above film would have a horizontal aperture path. Sound track on bottom of film.

The "Star" Salesman of the Industry . . .

RCA PHOTOPHONE INC SOUND EQUIPMENT

THE success of a motion picture today is not decided either in the reviewing room of the producer's studio, or by the combination of producing elements brought together in the picture. Its ultimate testing ground is in the projection booth of the theatre.

It is the projectionist who must "sell" the picture to the public through his ability to get out of the picture all that the studios put into it.

The modern projectionist takes as much pride in the reproducing qualities of his equipment as a musician does in the tonal qualities of his instrument.

In RCA Photophone, the projectionist finds an apparatus of such delicate and sensitive interpretative power as to make possible the rendering of productions in a manner that will greatly enhance their interest and drawing power.

The projectionist who takes full advantage of RCA Photophone's capabilities for the faithful and artistic reproduction of a picture becomes truly the "star" salesman of the industry.

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Royal Amplitone Sound System

A Synopsis of the Disc and Film Methods of Reproduction

ROYAL AMPLITONE CORP., which heretofore has supplied only apparatus for sound reproduction from discs, is now prepared to install their recently developed sound-on-film attachment, thus affording theatres a complete sound picture reproducing system for both disc and film. Along with the development of the sound on film attachment, Royal has made several improvements in its equipment which are incorporated as part of all present Royal installations. Following is a description of the Royal Amplitone disc and film system.

Batteries require considerable maintenance, result in the construction of battery rooms, complicated charging panels, chargers, and costly battery replacements from normal deterioration. To do away with this condition, the Royal amplifiers, types 12-S and 20-S, were developed. The small amplifier, type 12-S (Fig. 1), is designed for theatres having a seating capacity up to approximately 1,000; the large amplifier, type 20-S, (Fig. 2), will satisfactorily cover houses up to 4,000 seats.

Amplifier Types

Both of these amplifiers are of the complete 110 volt, A. C. operating type, and use standard commercial vacuum tubes throughout, obtainable from any radio dealer's stock. Vacuum tubes are the only replacements that will be required in these amplifiers. No sacrifice of frequency characteristics have been made to obtain these objectives. Royal claims a total absence of alternating current hum for these amplifiers.



Fig. 1. Royal Amplitone 12-S amplifier

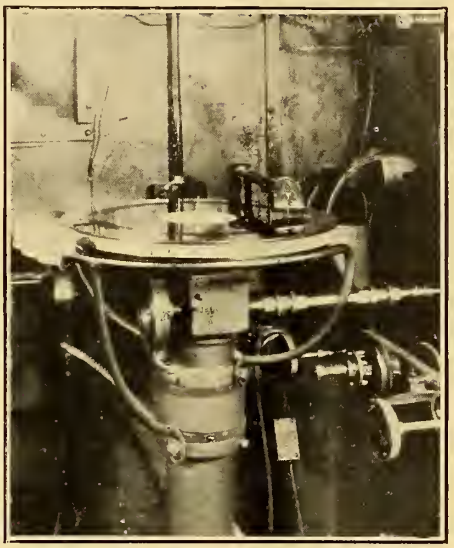


Fig. 3. Royal Amplitone turntable

Disc Equipment

The disc equipment was developed with the thought in mind of simplicity of construction and operation and low operating cost. It may be used on either Simplex, Powers, or Motiograph projectors. The high pedestal (Fig. 3), results in the turntable being at a very convenient height (approximately 48 in. from the floor) for the projectionist, who may see what he is doing without undue body strain.

The drive for the turntable is obtained from the intermediate idler gear. The transmission of machine vibration to the turntable is eliminated by the insertion of rubber connectors in the drive shaft between the projector and main turntable drive shaft. The turntable flutter is damped out by a novel spring arrangement in the gear pot housing, and the addition of a small flywheel on the end of the main drive shaft.

Oilless bronze bearings, shafts and gears are used throughout. No expense has been spared in making these bearings, shafts and gears the finest possible. Each is carefully tested and checked prior to and after assembly. The reproducer mounting is carefully felt insulated from the pedestal and the reproducer arm is again rubber insulated from the reproducer arm platform to remove all vibration that might be transmitted to the reproducer from the floor.

Sound Film Attachment

The film reproducer (Fig. 4), although originally designed for Simplex projectors, may be adapted for other projectors. For Simplex, the film equipment is designed to fit on the front plate of the head, and is attached to the bottom of the projector head mounting place by bolts. The lower magazine is dropped only two inches, allowing for convenient threading.

When silent or disc pictures are used, the film does not thread through the film sound attachment but is threaded directly into the lower magazine. When film reproduction is used, the film leaves the last sprocket in the projector head and passes over an idler under spring tension, an exclusive Royal feature, as a means for minimizing flutter. Here it is intercepted and aligned by a guide roller. It then enters the sound gate so designed that the sound recording on the film will pass over the light beam perfectly flat and in focus with this beam at all times. It is pulled through the sound gate and aligned by means of a sprocket driven from the main projector drive shaft. It then passes over another idler into the lower magazine.

Optical Systems

The optical systems (Fig. 4), are all adjusted by Royal engineers at the time of installation and are locked into the sound gate assembly. This entire assembly may be removed at any time to clean the lens without disturbing the adjustment of the optical system in any way. One small and conveniently located set-screw allows for the removal of this assembly.

The light slit is so designed that the film itself will take away any dust or dirt that may tend to collect there. The exciting lamp adjustments are positively controlled by means of thumb-screw adjust-

(*Continued on page* 12)



Fig. 2. Royal Amplitone 20-S amplifier

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THE 33 chapters in this book deal exhaustively with every phase of sound projection. The scientific and mechanical basis of sound pictures have been given full and simple treatment. Schematic and wiring diagrams of all parts of the sound machines and the amplifying systems are incorporated. Halftone illustrations for easy identification of the important parts are also included. Methods of operation and the rules of maintenance are fully described. There are excellent chapters devoted to common troubles and how to remedy them quickly. The phraseology is simple yet satisfying to the advanced projectionist and to the student. The book is carefully indexed, both for text and illustrations and a short but chronologically correct history of the development of sound pictures has been added for those who may wish such information.

Mr. Miehling, the author, is himself a practicing projectionist, a graduate technical engineer, and the designer of a popular sound device now in use in many theatres throughout the country. Due to his technical knowledge on the one hand and his familiarity with the projectionist and projection on the other, he is at present the best equipped person to have prepared this book.

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(*Continued from page* 10)

ments and are the only portion of the sound head that will need occasional adjustment, a clear field of light being maintained in the photo electric cell window at all times.

The photo electric cell is located at the top of the sound head and the small voltage changes as received from this cell are passed into the film amplifier located on the front wall of the projection room. This amplifier is used to raise the electrical volume to the same level as that of the disc reproducer prior to its entrance into the main amplifier.

The batteries for the film amplifier are located directly in under the film amplifier for both simplicity and the saving of expensive conduit runs and wiring. They are located in a box 6" x 24" x 12" and are mounted directly in front of the projector out of the way, yet are at all times readily accessible.

Photo Electric Cell Amplifier

The film amplifier is mounted directly above the film battery box and is an integral part of this assembly. It consists of a two-stage transformer coupled amplifier of the highest type, uses standard tubes, and the filaments of the tubes are lit from the exciter lamp battery used in the film attachment.

A battery box is supplied for the 12-volt storage battery required, and the only switch to be thrown is the one supplying 110 volt, A. C. power to the charger. This does away with expensive charging panels and costly conduit runs and wiring.

The Fader

The fader (Fig. 5), is essentially a constant impedance potentiometer and is inserted between tne outputs of the film amplifiers, magnetic pickups for disc, and the main amplifier. It is so arranged that various volumes may be obtained and either machine may be "faded" into. There is a key mounted on the fader that switches from film to disc equipment and vice versa.

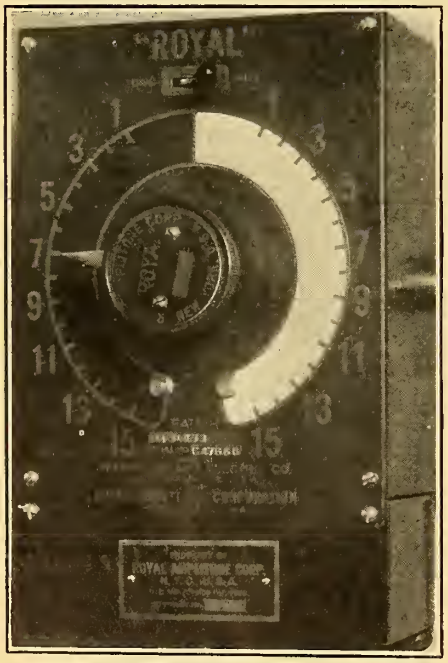


Fig. 5. Royal fader

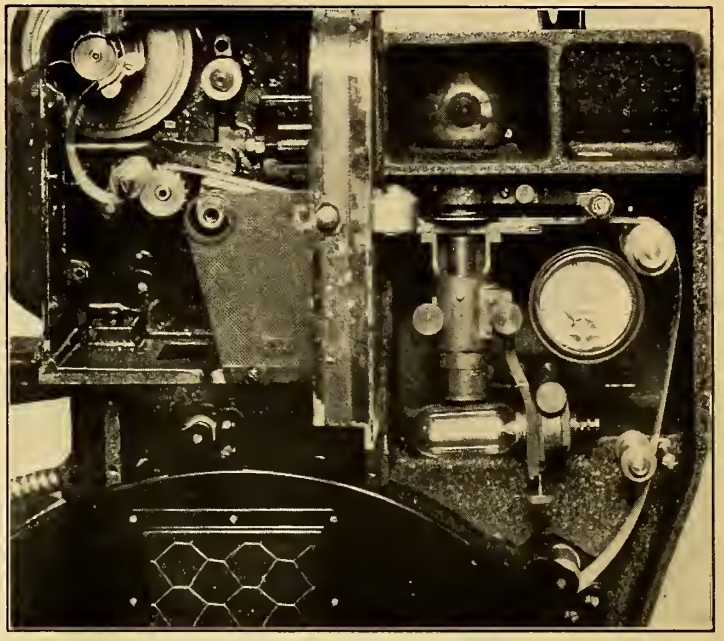


Fig. 4.—Sound film compartment on Royal Amplitone installations. The film passes through the chamber horizontally.

Wiring

There are two pairs of fourteen wires leading from the booth to back stage for the speakers. One pair supplies the 110 volt, A. C. or D. C. power for the exciting windings of the speakers and the other pair carries the voice frequency currents. Contrary to the usual practice of splitting the speaker supply at the booth, Royal engineers are taking the speech back stage in one pair of wires and are then splitting it up by means of an auto transformer to match the impedance of the speakers. This saves considerable in the line of conduit runs and wire and allows for much better impedance matching, than other systems which are not taking into account the differences caused in low impedance circuits due to the varying length of runs in various houses.

Projector Unchanged

The projector essentially remains the same. Contrary to the usual belief that constant speed cannot be obtained with the normal Simplex belt and friction disc drive, Royal engineers set about to prove that it could be done and succeeded. A smooth-running projector with belts and clutches in good condition will operate equally satisfactorily as compared with expensive motor and direct drive equipment. This is an additional saving passed on to the exhibitor. Power fluctuations are taken care of where necessary by means of synchronous motors. Royal engineers carefully inspect each projector and make such recommendations as may be necessary for the successful operation of the equipment.

Loud Speakers

Dynamic cone type speakers are used, mounted on 4 foot baffle boards. They are located directly behind the screen, giving perfect illusion. These speakers each have incorporated within them a miniature rectifying system to supply direct current for their exciting windings. This further does away with the use of batteries and their continuous upkeep care. Any of the perforated or loosely woven fabric screens now on the market may be used.

5,500 U. S. Theatres Wired for Sound Pictures

Latest reports indicate that there are more than 5,500 theatres in the United States wired for sound pictures. Western Electric, which seems well on the way to making good its promise to wire 3,000 theatres in 1929, leads in installations with a monthly average of more than 250 installations. A majority of the early installations were for disc reproduction only, but sound on film attachments are now in great demand.

Western Electric will probably top its estimate of 3,000 installations this year, according to word from its subsidiary, Electrical Research Products, Inc., who are daily adding new installation shifts to its roster. RCA, which is pushing its new P2 sound projector, is also making rapid progress and seems assured of even more business when its new Spoor-Berggren wide film process is marketed.

Demand Film Attachment

De Forest Phonofilm is quite strong in the West and South, and appears to be making new gains in the East. Royal Amplitone reports the best business month of its history, an advance which is attributed to the recent announcement of the Royal sound on film attachment. The lack of a suitable sound on film attachment has spelled finish for many of the so-called independents, theatre owners being unwilling to take a disc installation alone and then have to shop around for sound on film facilities.

Since producers supply pictures with sound on disc as well as on film, many theatres having only disc equipments are content to run along for a while without a sound film attachment.

Why?



Why do you need quality reproduction?

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Why does Western Electric equipment cost more?

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To answer these questions Western Electric announces a series of advertisements on quality reproduction.

The series will be informative, crammed with sound picture facts. It will be of interest and value to every exhibitor regardless of the equipment he has or intends to buy.

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PHOTOGRAPHS OF INCANDESCENT CRATERS AT 10, 12, 14 AND 16 AMPERES

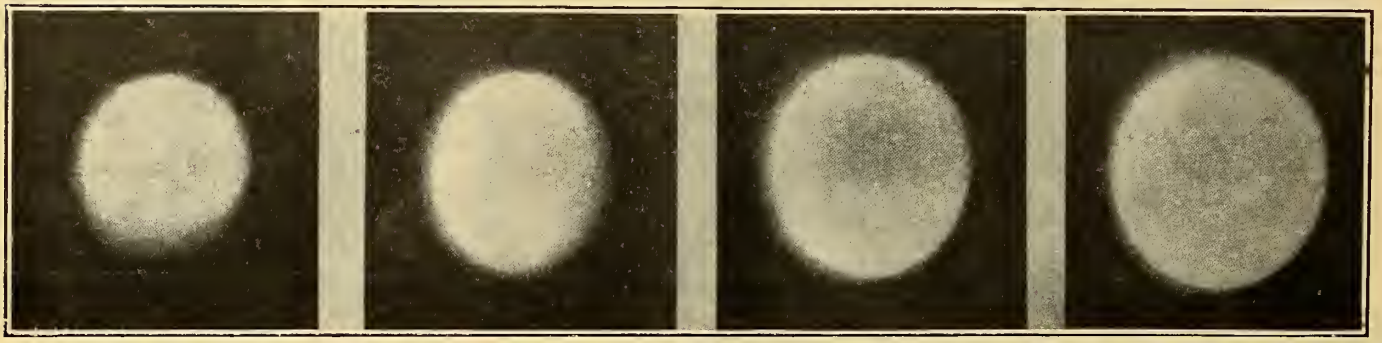


Fig. 2
10 Amps. Spot small, light unsteady, core burned out. Very inefficient.

Fig. 3
12 Amps. Spot larger, light still unsteady, core still burned out. Very inefficient.

Fig. 4
14 Amps. Spot larger, light still unsteady.

Fig. 5
16 Amps. Spot still larger, lower limit for 10 m/m carbons.

Carbon: Its Properties and Uses in Motion Picture Projection

By ENGINEERING DEPT., NATIONAL CARBON CO.

THE carbon arc has the greatest brightness per unit area of any light source known, not excluding the sun. It is not surprising, then, that it has been adapted to the projection of motion pictures, to the projection of stereopticon slides, to spot and flood lighting in motion picture and legitimate theatres, to the lighting of studios for the taking of motion pictures, to the lighting of photographers' studios, to photo-engraving rooms, to the large and powerful searchlights used by the Army and Navy, and last, but not least, to the modified type of searchlight used to illuminate the air mail fields being established throughout the country. This article, however, will be confined to the first mentioned use, that is, to the projection of motion pictures in theatres.

In addition to being the most powerful light source, the carbon arc is likewise the most flexible. The light on the screen can be varied at the will of the projectionist. For light films the current can be reduced, and for dark or colored films, increased.

The carbon arc is easy to operate; a few rules, however, should be kept in mind. This material has been prepared with the idea of assisting projectionists to obtain the maximum efficiency from their carbons.

Where Carbon Is Found

Carbon material is scattered widely throughout the world in many different forms. The diamond is pure carbon. If a bushel of diamonds were put in a base burner, they would burn like so much hard coal. If a diamond were placed in an electric arc, it would be converted into a soft, greasy material which we call "artificial graphite."

Coal is another form of carbon. Usually coal is a mixture of pure carbon with oily and tarry compounds and also considerable matter which is commonly spoken of as "ash." Carbon also appears in nature in the form of graphite, which is a shiny material usually referred to as "black lead." The soot which we used to see in the days when coal-oil lamps were used is an extremely pure form of carbon.

Properties of Carbon

If you were to take a piece of carbon and heat it in a furnace, the carbon would waste away and gradually disappear. If you took the same piece of carbon, however, and put it in a furnace from which all air was excluded, it would retain its shape and not melt under any temperature which can be obtained today. This property of carbon, i. e., to hold its shape and not melt, is one of the things that make carbon useful for the projection of light.

In order to bring this idea out more clearly, let us imagine what would take place if we substituted a ¾" steel rod in place of a ¾" projector carbon. Immediately upon striking the arc there would be a stream of liquid steel dropping from the steel rod. In addition to this, the steel rod would be heated almost red hot, all the way back to the holder. The temperature at the point of the steel rod would be approximately 1,400°, Centigrade, this being the melting point of steel.

If a copper rod were substituted for the steel rod, the temperature at the point would be lower, i. e., about 1,000°, Centigrade. A large amount of heat generated in the arc would be carried back to the holder, as copper conducts heat very readily. And if we were to try some non-metallic material, such as a fire-clay rod, we would obtain no arc, as fire-clay does not conduct electricity.

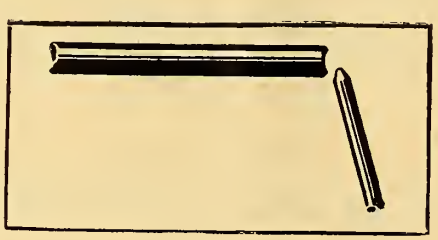


Fig. 1

But, in carbon we have a material which is a fairly good conductor of electricity, which can be heated to a high temperature without melting, and which does not conduct heat readily. This last point is a very important one because it is desirable to hold as much heat at the point of the light source as possible, and not conduct it back where the light is not useful for screen illumination.

Manufacturing Process

Although the carbon manufacturer has many different kinds of carbon from which to select in making up projector carbons, only that of the highest purity should be used. Incidentally, it might be mentioned that the manufacture of projector carbons is a long, slow and tedious process. It takes, approximately, from four to six weeks to make carbons. The baking process, alone, requires from ten days to three weeks, depending upon the kinds being produced.

With the ordinary carbon arc the crater brightness has been found so constant and reproducible that it has been proposed as a standard of light. This is quite contrary to the incandescent lamp which is particularly sensitive to fluctuations in line voltage, while the intrinsic brightness of the carbon crater is independent of arc voltages, so long as a sufficient voltage for arc stability is maintained. It naturally follows that due to the constancy of brightness of the positive crater, the light obtainable from a carbon arc is nearly proportional to the crater area.

The following table shows the actual crater brightness of various light sources:

INTRINSIC BRIGHTNESS OF LIGHT SOURCES

Light Source	*Candle Power per Sq. M/M*
High Intensity White Flame Carbon Arc, Forced	1200
Pure Carbon Arc at 22 atmospheres (*about*)	1000
Sun at Zenith	920
High Intensity White Flame Carbon Arc, as usually operated	690
Positive Crater at Tantalum Arc (*about*)	500
Positive Crater of Solid Carbon Arc, on D. C.	180
Positive Crater of Cored Carbon Arc, on D. C.	130
Yellow Arc Stream	8.0
Magnetite Arc Stream	6.2
Mercury Vapor Tube	0.023
Moore Carbon Dioxide Tube	0.009

One of the important assets of the carbon arc is its flexibility, permitting wide adjustment of screen light by changes in the current. This is especially important with dark or colored films where the same arc lamp may be satisfactorily used over a fairly wide range of conditions. This cannot be done with other types of light sources and any attempt to do so will result in the rapid deterioration of the lighting elements of those sources.

Relation of Carbon Diameter and Amperage to Candle Power

The relation of carbon diameter and amperage to candle power is of special interest to the projectionist. While the crater area (hence the light), increases with the current, it also depends to a surprisingly high degree on the carbon size. An interesting demonstration was made in our laboratory which brought out this point very clearly. A right angle mirror or reflecting arc lamp, i. e., one in which the positive carbon is set in a horizontal position, and the negative at an angle of approximately 75 degrees with the horizontal, was used (Fig. 1).

The mirror reflector was taken off and the lamp housing reversed with respect to the screen, so that the positive crater was pointing directly towards the screen. An objective lens of 6¾" equivalent focal length was then mounted on a standard, which standard was supported by the grooves ordinarily supporting the mirror reflector. The light rays emitted by the carbon crater, upon passing through the lens, were then projected on the screen, forming an enlarged image of the crater, the extent of the enlargement being dependent upon the distance from the lens to the screen and also the focal length of the lens itself.

In this particular demonstration, the diameter of the image of the positive crater on the screen was approximately 30 times the diameter of the actual crater. A 10 m/m x 8" National cored projector carbon, which has a current range of from 16 to 20 amperes, inclusive, was used as the positive. This particular size of carbon operates most efficiently at 18 to 20 amperes.

However, to show that there is a different white hot spot, or crater area (as it is more commonly known), for every value of current, we started at 10 amperes and then increased the current in steps of 2 amperes. It was observed that at 10 amperes the light wandered about on the tip of the positive carbon, due to the fact that the tip was too large for the amount of current being employed, with the result that the light was unsteady and required considerable attention to keep it adjusted. It was also observed that at the low current, the core, being softer than the shell, burned out, showing a black spot in the center of the projected image.

Crater Size at Various Amperages

As the current was increased, the white hot tip, or spot, increased in size. At 18 to 20 amperes, the point of maximum efficiency, the arc burned quietly and steadily and the white hot spot was about as large as it is possible to obtain from the diameter of carbon used. As the current was increased above 20 amperes, the arc became unsteady and hissed frequently. The force of the current at the high amperage was also such as to blow the core out. The carbon also penciled away rapidly.

The photographs, Figs. 2 to 9, inclusive, show the incandescent craters at the various amperages. They were taken with the camera and lamp in a fixed position, consequently the pictures show a relationship between the size of the crater and amperage.

The small dark spots in the center of Figs. 2 and 3, likewise in Fig. 8, show the absence of a portion of the core in the positive. In the first mentioned cases the core was burned out, and in the other case, blown out, as previously explained. It will also be seen that the point of maximum efficiency is just below the maximum current-carrying efficiency of the carbon, or in other words, at around 18 to 20 amperes. This principle applies to all projector carbon arcs, except the high intensity, which will be discussed later.

Proper Trim Essential

Here and there a projectionist uses a larger trim than recommended in order to save trimming or to cut carbon cost. By so doing he sacrifices light, steadiness, etc. Compared with other expenses in a theatre, the carbon cost is negligible. It really amounts to only a few cents a day. That which the theatre is selling to its audience is really the picture on the screen and unless properly lighted, a high-priced film loses its effectiveness as entertainment. It is poor economy, therefore, to use other than the best quality and proper combination of carbons.

Reference has been made to the high intensity arc. In the high intensity arc the light does not come from an incandescent crater but from a gas ball confined in the cup-shaped crater of the positive carbon. The gas ball is caused by a vaporization of the chemicals in the core. When operated at low amperage, the gas is not confined in the crater but, as the amperage is increased, the arc stream from the negative carbon forces the gas into the crater which then becomes cup-shaped and the "high intensity" effect is obtained.

[*This is the first of a series of three articles on projection carbons which will appear in these columns. The second installment, which will appear in the next issue, will discuss proper carbon trims with regard to A. C. and D. C. and low intensity and high intensity lamps.*—The Editor.]

PHOTOGRAPHS OF INCANDESCENT CRATERS AT 18, 20, 22 AND 24 AMPERES

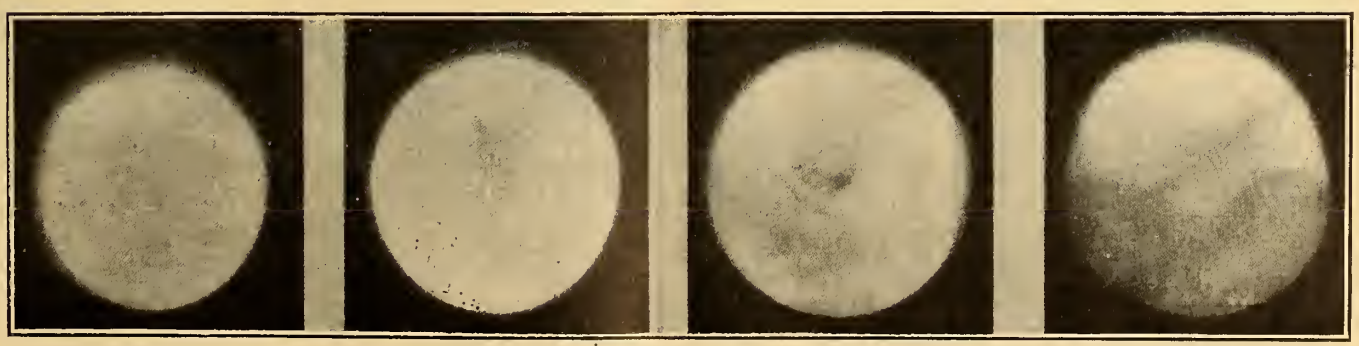


Fig. 6
18 Amps. Good arc. Almost maximum efficiency.

Fig. 7
20 Amps. Quiet, steady arc. Maximum efficiency.

Fig. 8.
22 Amps. Unstable arc. Frequent hissing, core blown out. Carbon overloaded.

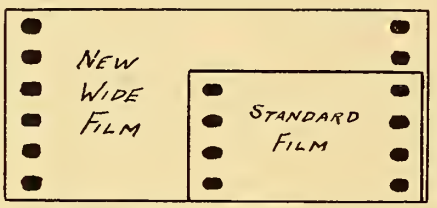
Fig. 9
24 Amps. Arc still more unstable—more hissing. Very inefficient.

As The EDITOR Sees IT

¶ *The Spoor-Berggren Process*

SEVERAL letters which are in front of us as we write intimate that our description of the new Spoor-Berggren wide-film process in the June issue was a trifle exaggerated. Our correspondents hint that while we may have disclosed something new we have not succeeded entirely in convincing them that the process is all that we said it was and that it will shortly be the conventional size for motion pictures. We hasten to assure these doubters that we actually witnessed such a demonstration, and, while we do not agree with some who claim stereoscopic relief for the process, we do feel that we have been given a large picture with excellent detail.

It might be well to dispel this illusion about the process embodying stereoscopic relief. In the demonstration we witnessed there was marvelous detail and an "illusion of depth," by which we mean that some slight semblance of depth was conveyed to the eye. That the picture caught objects far distant from the camera lens does not imply that it had captured "depth." Exclusive of this slight misunderstanding about "depth," the process is everything its sponsors claim it to be. It is a wide film with excellent detail; and what more could be asked?



Comparative diagram of wide and standard films (without sound track)

For the benefit of those who have expressed doubt as to the existence of such a process, we are reproducing herewith a comparative diagram of the standard size film and the new Spoor-Berggren film. This diagram was prepared from the film itself and shows their proportions relatively. No provision has been made for a sound track on either film. It will be noted that the new film has six sprocket holes as against four for the standard size. It is understood, of course, that this new process requires a special projector attachment, in which provision has been made for the proper gears and a special compressed air device to keep the wide film in proper alignment as it passes the aperture. Complete details of this attachment will appear in these columns as soon as the data is available.

Mention of the projector attachment brings us to another phase of the motion picture industry which is certainly not receiving its due these days. And that is the matter of exhibition, in which we all have an interest.

¶ *Some Exhibition Problems*

WE often sit back these warm summer days and wonder how the harrassed motion picture exhibitor gets by, how he manages to keep his theater open and still eke enough out of his till each week to compensate him for his long hours of work and worry. Now that he has strained his resources to the limit to finance the installation of sound pictures in his theater, he suddenly finds himself face to face with a new worry—we refer, of course, to wide film. Improvements are desirable, of course, but the price for improvement cannot forever be levied on the theater box-office and still have the exhibition end of the industry maintain an even keel.

We have always contended that this business of sound pictures was improperly handled on the exhibition end. With so-called legitimate shows getting anywhere from one to five dollars for a good seat, why was it not permissible for the motion picture exhibitor to pass the cost of sound equipment on to the public? It was permissible, of course, but nobody thought of that. The show was improved 100 per cent, but the admission price remained the same. The question to which there seems to be no answer is "Why."

Does the theater which programs sound pictures do double the business it did before it was wired? One exhibitor friend assures us it does not. What we should like to know, then, is where the money comes from to pay for all these marvels of the electrical age. And the end is not yet. For soon Mr. Exhibitor will be asked to junk his present sound picture head (which he probably bought new with the sound installation), and supplant it with a new attachment for wide film. But will he raise his box-office price? Not at all. Just why it is that the motion picture industry seems destined to forever remain in the 15-25-35 class will always be a mystery to us. One probable reason for it is the fact that some theaters are now double-featuring sound pictures, which is our idea of the height of absurdity. Sometime and soon the industry will pay the price, and a dear one, for their unwillingness to come to grips with this problem.

¶ *More Reflections on the Craft*

WE have often expressed ourselves as proud of the manner in which the craft met the challenge of sound pictures, and nothing has happened to cause us to change this opinion. We regret to note, however, that others in the motion picture industry do not share our enthusiasm for the fine work being done in the projection rooms of theaters throughout the country. We have before us several clippings from motion picture trade papers, daily newspapers and other periodicals in which the responsibility of the projectionist for several unfortunate happenings with sound picture programs is stressed. The keynote of these articles seems to be that, while here and there is a projectionist who can be relied upon to put over a sound picture show very well, projectionists, as a craft, are entirely unfitted to be trusted with such an important responsibility.

We have often wondered just how it is that these people who don't know the first thing about projection can sit back in their chairs and get off a fiery article on the delinquencies of the projectionist craft. We admit that it is possible, but it certainly isn't being done with any degree of success by those who are responsible for the material mentioned above. To take one specific charge as an example:

A picture which had received an enormous ballyhoo prior to its Broadway showing was a complete flop on

its first night out. The sound sequences in this picture were pretty bad, and the reason for this was apparent to anyone who knew anything about the art. But what happened? One of the motion picture trade papers carried a story to the effect that a good picture had been ruined by the poor treatment it received from the projection crew. We read the criticism and promptly discounted it.

A few days later we heard that one of the Bell Telephone Laboratory technicians had hurriedly left for the West Coast there to "clean up" a certain studio. The answer is, that to those hard-hearted technicians who thought only in terms of their own work and good results and had no excuses to make, as did the trade paper, the picture itself was evidence enough of just what had happened. Some weeks later a new and improved sound accompaniment was supplied for the picture in question. Our curiosity impelled us to search the columns of the same trade paper for additional comment. And our search was rewarded:—for we found an item which stressed the improvement in that particular picture, which, we were assured, was due wholly to intelligent projection work.

While we do not profess to believe that all projectionists are perfect, we do believe that in nine out of ten instances poor sound picture results may be traced to a failure of equipment or faulty recording. The matter of proper volume control is still unsettled, and the only present means of improvement seem to lie in adequate rehearsals and proper cue sheets. Even improved recording technique would probably fail to eliminate this difficulty, what with each theater having its own particular acoustical requirements.

¶ *Projectionists and the S. M. P. E.*

THE coming meeting of the S. M. P. E. in Toronto, Canada, on October 6th, promises to be the best gathering ever sponsored by that organization. The Papers Committee of the Society is now hard at work arranging for the presentation of a series of papers which bid fair to be the most interesting ever assembled for one meeting. Sound pictures will, of course, receive the larger share of attention, but there are sure to be other interesting papers which always insure a well-balanced program for those in attendance.

Projectionist membership in the S. M. P. E. has steadily mounted, until today they comprise more than seven per cent of the total membership. This in itself is sufficient indication of the progressive spirit of the craft, particularly when it is considered that projectionists, unlike other technicians, have no employer to pay for their dues and traveling expenses when attending Society meetings. At the last meeting in New York, we met several projectionists who came from as far away as Knoxville, Tenn., to attend the sessions. Their expenses for this trip must have been considerable, yet they assured us that they felt amply repaid for having attended.

¶ *Local Union Educational Societies*

SEVERAL Local Union officers have taken the initiative in forming schools in which to instruct the membership in the details of sound picture equipment. The latest one to adopt this idea is Local 650 of Westchester County, N. Y., where President Shaughnessy has arranged to provide instruction for the membership, with the equipment under discussion to be set up in the lecture hall and representatives of various manufacturers to be in attendance to explain the various equipments.

Local 306, New York City, has long had educational facilities, and some splendid results have been obtained. Up in Boston Secretary Burke is receiving the congratulations of the membership for the fine work being done by the school which was formed under his direction.

Local 173, Toronto, Canada, has recently formed a Projection Club, and reports have it that the membership finds the discussions at these meetings to be a great aid in their daily work. Youngstown, Ohio, is another city which we recall having held regular educational meetings for the discussion of projection problems. Other Local Unions throughout the country hold educational meetings at regular intervals, and in every instance the membership is enthusiastic about the work of the school.

Many other Local Unions have endeavored to launch educational societies only to have the schedule disrupted either through mismanagement or the interjection of other than strictly educational subjects. The experience of the above mentioned Local Unions in the matter of schools for instruction would seem to indicate that, with a willingness on the part of every member to attend strictly to the business in hand, and the earnest effort on the part of those responsible for the school to manage the enterprise efficiently, there is no good reason why every Local Union could and should not successfully adopt the idea.

In the near future we shall have the pleasure of having Secretary Burke, of Boston, tell us just how the Local 182 school is run.

¶ *Concerning "In the Laboratory"*

SEVERAL items in Samuel Wein's department, "In the Laboratory," this month attracted our attention, namely, his comments on television (which, incidentally, coincide with our own opinion); the results of an experiment with selenium cells, and the effort of several workers to provide a new source of potential for exciting lamps. These are all very important and interesting subjects and call for considerable thought from progressive projectionists. With regard to the selenium cell experiments, we happened to be present when several of the experiments were being tried, and we agree fully with Mr. Wein that selenium has been underestimated by workers in the sound picture field. Selenium, in addition to its greater efficiency, has a big advantage over the photo electric cell in that it successfully hurdles the obstacle of patent rights. The elimination of storage batteries in the projection room will be another big advance. Just now batteries are causing no little trouble both in the matter of maintenance and replacement. The use of rectified A.C. current for projection purposes will greatly simplify the task of the projectionist without hindering in any way the quality of the reproduced sound.

It might be well at this time to direct attention to Mr. Wein's patent articles which appear in his department from time to time. Very often the coming of a new improvement in the art of sound pictures is heralded far in advance by the citation by Mr. Wein of certain occurrences in regard to patent litigation. Just now there is some question as to the patent rights to the slit used in all sound-on-film reproducers. Should anyone establish clearly an exclusive right to the use of this slit, the industry would witness a tremendous upheaval.

Subjects such as this are extremely interesting, and Mr. Wein's comments from time to time are both instructive and reassuring.

JAMES J. FINN.

Types of Amplifier Couplings Used for Sound Pictures

By J. GEORGE UZMANN

WITH the advent of sound pictures the projectionist was called upon to operate a relatively complex piece of radio or signal communication apparatus in addition to his projection equipment. It soon became apparent that in order to be considered a good operator of this type of apparatus, it meant obtaining a complete knowledge of the operation of the various sound components. It is the object of this paper not to again describe the essential units of modern equipment, but rather to go into the non-technical details of the several types of audio frequency amplifier coupling systems. This is important because it must be remembered that a vacuum tube is generally considered to be the heart of the system, and, of course, the method of coupling one tube or stage to another proves it to be equally essential that a full appreciation of the problem be realized by the progressive projectionist.

Three Types of Coupling

It will generally be found that in sound picture work three essential types of amplifier coupling mediums are employed singularly or in combination in the several group amplifiers. By the coupling medium is meant (1) a transformer or other impedance, such as (2) an iron-cored choke coil or (3) a resistance. Each of these three units make up an impedance, which in turn must be of a value sufficient to form a "tube load" or "impedance ratio" so that the signal is efficiently amplified and transferred into a following amplifier tube.

It is all quite true that almost any form of coupling medium, regardless of its nicety of design, will invariably transfer signal or sound energy from tube to tube. However, in sound picture work we are interested not only in obtaining a maximum energy or sound transfer between tube stages, but what is most important is that the sound quality or fidelity of reproduction remains very nearly unaltered throughout the system. The latter characteristic is therefore a major consideration and this, of course, means that fidelity of reproduction, regardless of low operating efficiency, must first be satisfied, and a loss in volume, such as is the case with a resistance type of coupling can readily be compensated for by an additional stage of amplification.

As briefly mentioned before, three types of coupling mediums are ordinarily employed in sound projection amplifier systems:

(1) Resistance—Capacity.
(2) Choke coil—Capacity.
(3) Transformer.

Resistance and Choke Coil Couplings

In order to cite a practical case, let us glance at the circuit wiring diagram, Fig. 1, which shows a schematic view of a standard Western Electric type 41-A amplifier. Between the second and third 239-A vacuum tubes there will be noted a network made up of a resistor going into the plate circuit of the second tube.

The value of such a plate or load resistance is ordinarily from three to five times the internal tube plate resistance. Of course, the ratio could be smaller, but modern amplifier theory shows that for ratios smaller than three to five, the amplification per stage falls to a low value. Again, depending upon the type of tubes employed, low valued plate resistors result in a loss of tone quality.

In so-called choke coil type couplings an iron-cored choke coil replaces the plate resistor. There is little to choose from between the two methods of coupling, excepting the direct current resistance of the copper coil winding is, of course, much lower than is the case for a pure resistance, and therefore one does not experience a large "voltage drop" or loss. However, this characteristic is no longer important because modern rectifiers produce sufficiently high voltages to more than offset the loss.

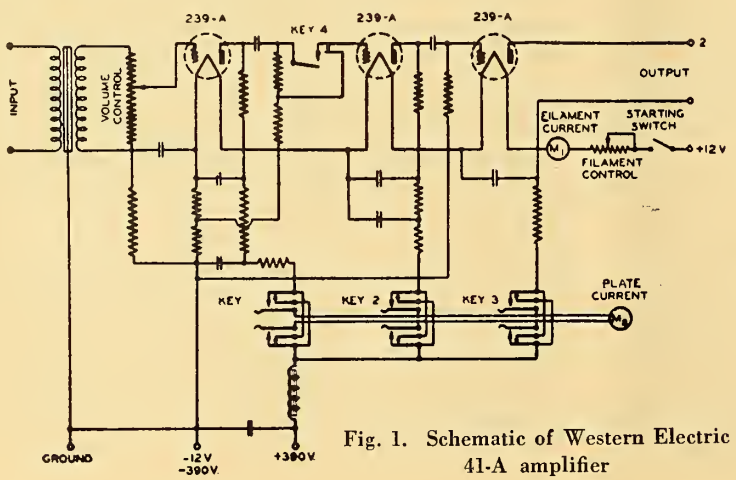


Fig. 1. Schematic of Western Electric 41-A amplifier

On the other hand, a somewhat higher degree of amplification can be obtained from a choke coupling than from a resistance type, but a drawback is found in that unless such a choke is very carefully designed, the quality of reproduction may suffer. In other words, the reactance and resulting impedance of any type of copper coil winding goes through large changes due to tonal frequency.

Resistance Type Preferable

For such reasons we find that the Western Electric type 41-A amplifier judiciously resorts to a resistance type of coupling within the several stages, particularly at the low volume end of the system where it is most important to maintain the highest degree of tone quality, because any inaccuracy at this point must, of course, result in added amplification and, finally, distortion being transferred from the loudspeaker system.

But to go back to the coupling, it is evident that before the signal reaches a succeeding tube it is forced to pass through a "blocking or coupling condenser." The latter serves a dual purpose: (1) to keep the high direct "B" or plate voltage off the grid of the following tube, and (2) the condenser must be of such order as to freely pass all audio frequencies or tones within the useful range of the amplifier.

Finally, a high value "grid leak" resistor is seen to connect between the grid of the third tube of Fig. 1 and the 12 V. "C" or grid biasing voltage. Tone fidelity depends largely upon the electrical values of (1) the coupling condensers and (2) the grid leak.

Transformer Coupling

This type of coupling in many ways possesses electrical characteristics not found in either resistance or choke coil varieties. For example, transformers result in better operation where the overall power or amplification becomes large, but due to their construction, the turn ratio existing between the primary and secondary windings can be so developed as to produce finally a voltage or power step-up or down. In fact, the transformer proves a most flexible medium or tool in the hands of signal engineers.

In other words, if we are dealing with an intermediate amplifier stage tube, theory shows these devices to be voltage operated and therefore the larger the signal voltage impressed on the tube grid, then the larger will be the change in plate current. For such reason, in the case of both resistance and choke coil couplings, one can never get a voltage amplification ratio larger than 1 to 1 (in practice it is generally much less than unity); nevertheless, high quality transformers are capable in themselves of impressing signal ratios from 3 or 4 to 1 upon the grid of a succeeding tube. This

is a most important characteristic of transformers, but, of course, it requires a complete understanding of the problem so that tonal quality is not unduly sacrificed when gaining amplification.

Audio transformers can also be built so that instead of producing a maximum voltage output, as just shown, maximum current or power becomes equally attainable. This is a requirement for the case of the output transformers used for feeding our loudspeakers. Loudspeakers are power operated devices and simply one form of reciprocating motor mechanism. In this case we have a complete reversal in transformer characteristics over where such a unit is employed as a coupling medium within the intermediate amplifier system.

Push-Pull Amplification

Now let us glance at Fig. 2, which shows the schematic circuits of a standard Western Electric type 42-A power amplifier. Here we note, apart from the plate and filament supply system, that the amplifier consists essentially of a so-called push-pull system, whose output power is fed through a stepdown transformer of proper impedance ratio so as to finally supply maximum undistorted sound energy to a series of loudspeakers. Incidentally, type 43-A amplifiers, which are used only for large theatre work, embody essentially the same circuit arrangements, except that 50-watt power tubes replace the 5-watt types found in 42-A amplifiers.

Looking at Fig. 1 we see how a step-up type of transformer employing a single secondary winding is connected up between the faders and the amplifier input. Now, in Fig. 2 the input transformer of the 42-A amplifier is of a different type, since the secondary winding employs a mid-tap connection for push-pull stage operation.

The technical phrase "push-pull" apparently is a sort of a stumbling block for many projectionists, and a few words will not be amiss in describing the operation of this type of amplifier.

Analysis and theory of such a tube stage circuit shows that if we evenly divide an impedance—say, the transformer secondary—then the induced voltage within the winding will uniformly divide itself into two parts: thus if 40 volts are generated across the outside windings, then 20 volts will be impressed upon each tube. Now, since each tube is in a different or separate electrical circuit, the voltage on one branch will be increasing at a given instant while at the same time it will be decreasing in the opposite branch. Much the same order is followed with reference to the output circuits of the two tubes and it is from this basic principle that the phrase "push-pull" was coined.

Push-Pull Operation

Now, the effect of this mode of operation is several fold. For example, if the maximum signal which can be placed on the grid of a given type of tube is, say, 25 volts, it is quite evident that a 40-volt signal would cause maximum distortion. However, through push-pull operation this problem is easily solved. Again, the power output of such a circuit is approximately double that of a single tube; and where still further power may be required, as is frequently the case, then two such amplifier systems such as the 42-A models can be connected in parallel.

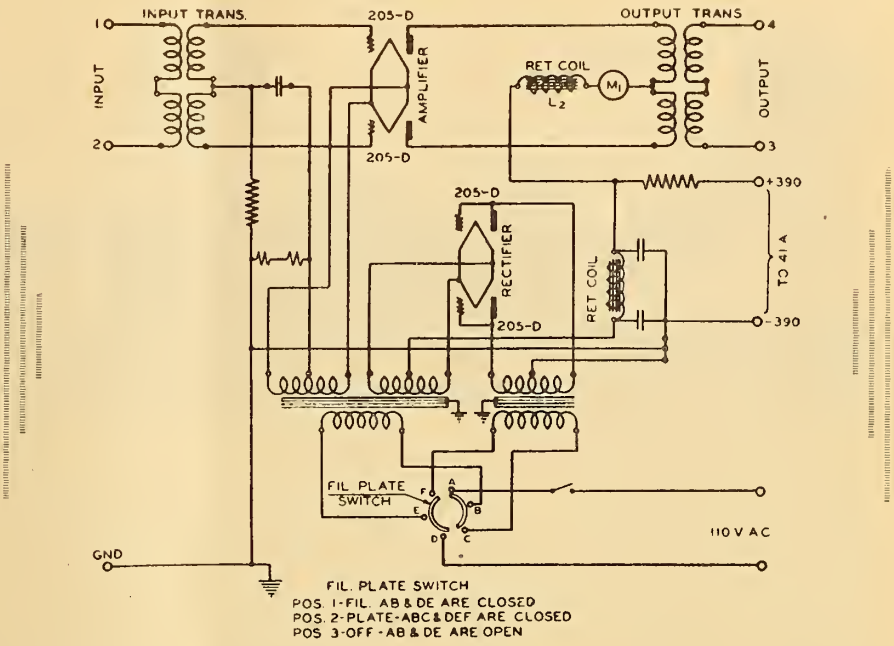


Fig. 2. Western Electric 42-A amplifier

A further important characteristic of the push-pull scheme is found in the fact that where so-called "phase distortion" exists due to the use of several inductances placed in tube plate circuits, a peculiar phenomenon results in that the signal wave shape becomes distorted. Such distortion develops harmonics, which are tones not found in the original signals. However, a push-pull stage in itself will not develop such a type of distortion and this again shows the wisdom of modern practice.

It is hoped that in this non-technical paper a number of essential features have been explained concerning the theory and operation of modern forms of audio frequency coupling devices found in the majority of present-day sound picture equipment, and that the projectionist will have a better understanding of that part of his operating equipment.

Expert Scores Excessive Film and Camera Speed

"THE impression of depth in talking pictures depends almost wholly on the acoustic qualities of the set," J. P. Maxfield, of the sound engineering department of E. R. P. I., declared in a talk recently before the Academy of Motion Picture Arts and Sciences in Hollywood. "The property by which we hear depth with the single ear of the microphone is our ability to distinguish between the loudness of the direct sound coming directly from the speaker's lips as compared with the echo or reverberation that is actually in the room."

Problem of "Live" Sets

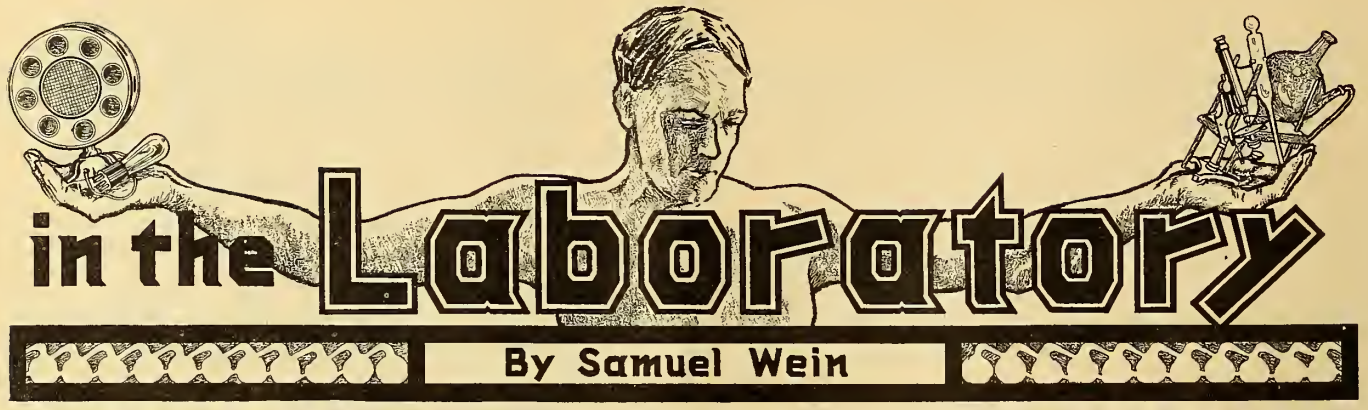
Maxfield asserted that "live" sets with sufficient reverberation and the use of a single microphone have given the actor and director increased freedom. Under these conditions the voice will seem to follow the actor who can walk about the set freely and even turn his back to the microphone and camera if the action calls for it.

"The motion picture industry is wasting three or four million dollars a year by photographing at 90 feet a minute instead of 60 feet which would do just as well," Roy J. Pomeroy, pioneer sound director, declared as his belief based on experiences in sound pictures. He predicted that when wide film comes into general use it will be run at 60 feet a minute either with the sound track on the side or with sound on a separate 16 mm. film run at 120 feet a minute.

Advocates Old Speed

"The 90 feet a minute speed, like the present frame size, was inherited from previous conditions before the sound revolution," Pomeroy asserted. "Motion pictures used to be photographed at 60 feet a minute and the speed gave good results. Theatres, in an effort to get their show over sooner, speeded up the projection. The studios then gradually increased the rate; film was run through the camera in order to maintain the action of the picture at normal speed. Finally pictures were made and projected at 90 feet a minute.

"When sound came in the electric companies knew they couldn't record sound on film at 60 and have it projected at 90. They asked the studios and the theatres what the practice was and then built their recording machines for the 90 foot speed. It is true that with the present machinery and conditions the sound can be recorded better in a foot and a half than in a foot. But why not put the sound track on a separate 16 mm. or small gauge film which could be run at 120 feet a minute? This would not need to be run intermittently, could be carefully enclosed, and the film would last indefinitely."



Exciting Lamp Using A. C. Potential

THE fact that sound motion pictures are now going through a process of refinement in the existing apparatus is evidenced by the fact that many experimenters are daily making new advances which tend to simplify and at the same time increase the efficiency of the various units. One of the most interesting of these tests is now in progress in connection with the exciting lamp which is used for reproducing sound on film.

At present the potential applied to the exciting lamp comes from a storage battery. Several experimenters are now making use of various forms of rectified A.C. properly filtered to eliminate a superimposed ripple in the amplified sound emanating from the loud speaker. The results secured by some of the workers in this direction are gratifying, yet not fully practical from a commercial standpoint.

Batteries to Go

We have recently witnessed an attempt of one experimenter in increasing the 60 cycle A.C. source to an extremely high frequency current, with which the exciting lamp is in series. It is said by this experimenter that the filtering of the amplified current is much more simple and proficient. Whether or not this is so remains to be seen. The important point to be remembered, however, is that all this experimental work is bound to produce results and it would not surprise this writer if in the near future all batteries for exciting lamp current were to be eliminated.

Is Television "Just Around the Corner?"

Recently we have received several inquiries from readers on the matter of television, and only a few minutes ago (as we write) we were favored with a visit from a friend who positively assured us that one of the large electric companies has perfected plans to install television apparatus in a Broadway (N. Y.) theatre this Fall. Where such rumors originate, one is hard pressed to know but, the fact remains that many similar reports are constantly being circulated.

Commercial Television Remote

We wish to advise our readers that they need not be unduly excited about the probability of television on Broadway this Fall or next Fall or any other season for some years to come. This statement is based on the fact that we have witnessed every important television system which has been described or demonstrated. The results seen are purely laboratory performances and, furthermore, seem destined to remain such for some time to come. Just now it is difficult to hold the image on the screen for any definite period, and the results obtained are disappointing—much less suited for the exacting tastes of an American theatre audience.

Stock Promotion Drive

Too much credence have been given of late to stock promotion television systems, particularly to one firm whose system has not even crept out of its laboratory experimental stage, and whose main work seems to be not experiment but the broadcasting of airy publicity.

We therefore can assure our readers that we are not concerned at present in discussing any television systems, and that they need not be disturbed by reports of the early appearance of television on Broadway or any other amusement thoroughfare.

FROM time to time we shall have the pleasure of including in this department contributions from various prominent persons who are actively engaged in a branch of the motion picture industry. This month it is our pleasure to present a contribution by H. R. Van Deventer, engineer and patent attorney. Under the general heading of "The State of the Art From the Patent Standpoint in Respect to Sound Motion Picture Systems," Mr. Van Deventer will discuss in a series of articles many of the devices now in common use in the industry.

Mr. Van Deventer has for many years specialized in this field, having formerly been prominently identified with a manufacturer of telephone apparatus, and later on as Patent Attorney with the Westinghouse Electric & Manufacturing Co., and Vice-president of the Dubilier Condenser & Radio Corporation.

In addition to his experience with patent matters, Mr. Van Deventer is thoroughly familiar with the practical aspects of the apparatus involved in sound and picture reproduction; and we feel sure that his series of articles will prove as interesting to our readers as they did to us personally.—SAMUEL WEIN.

I. Existing Systems

By H. R. VAN DEVENTER

Consulting Engineer and Solicitor of Patents, New York, N. Y.

Several thousand patents are involved in the making and reproduction of sound pictures and these are found in many classes as the inventions involved relate to chemistry, photography, electricity, sound recording and reproducing mechanism, electrical and radio circuits and auxiliary devices used therewith. No attempt will be made in this article to trace the historical development of the art or to include references of the vast published and unpublished art and general literature of the subject, the present article being confined largely to a discussion of United States patents and their general bearing on existing sound motion picture systems and apparatus.

The commercial field today embraces two sound motion picture systems:—

1. Where the sound is recorded upon a suitable record such as a disc and the picture upon the usual film, the sound record and picture film being operated in synchronism, and

2. Where the sound is electrically recorded upon the picture film.

There are other systems, but practically all systems now in commercial use follow under one or the other of the above headings.

Recording Requisites

The sound disc and picture film system includes the following elements:—

For recording:

A. A suitable film to produce a negative, hereinafter termed the "picture film."

B. A suitable camera for taking the picture, hereinafter termed the "camera."

C. A suitable sound record such as a disc or cylinder, upon which the sound may be recorded, hereinafter termed the "sound record."

D. Means for recording the sound upon the record, hereinafter termed the "recorder."

E. Means for synchronizing the picture film and the sound record.

Essentials for Reproduction

For reproducing sound pictures made in accordance with the foregoing steps, the following elements are employed:—

A. A suitable positive picture film.

B. A suitable projector.

C. A sound record, usually a copy of the master record.

D. A suitable reproducer.

E. Means for amplifying the reproduced sound.

F. A suitable loud speaker.

G. Means for synchronizing the sound record with the picture film.

An early patent showing a complete system containing many of the above elements is United States Patent to Gaumont 752,394, patented February 16, 1904. This shows a moving picture machine, or projector, and an ordinary phonograph of the cylinder type. The patent states that these devices may be of any known types and the main subject matter of the patent relates to means for synchronizing. Claim 1 reads as follows:

"The combination with a phonograph and its motor, of the kinematograph, an electric motor which drives the latter, a source of electricity, and means controlled by the motor of the phonograph for distributing the current supplied to the field magnet of said electric motor, in constant angular relation to the phonograph, whereby synchronous relations are maintained between the movements of the phonograph and kinematograph."

A study of the patent reveals that the picture film and sound record are started from a marked place on each and that no arrangement is provided for any adjustment should any subsequent adjustment be necessary while the machine is in operation. Such hand adjustment is, however, shown in the patent to Gaumont No. 759,693, patented May 10, 1914, claim 1 of which is as follows:

"In mechanism for driving a kinematograph synchronously from and by a phonograph, hand-operated means between the said instrument for correcting and altering their synchronism when the kinematograph shall not have been started simultaneously with the phonograph."

The two above expired patents show reproducing outfits, but it is obvious that these devices can be used to record as well, and taken together, these patents disclose broadly a system employing the sound record synchronized with the picture film with manual adjustment for correcting and altering the synchronism.

Two Recording Methods

Starting with these two early patents as a basis and considering the various elements that have been briefly outlined in the beginning of this article, it will be seen that the recorder for making the sound record is of paramount importance. Consideration of this may be divided into two classes—

1. Recording by means of a mechanical recorder, the cutting stylus of which is actuated by the sound waves impinging upon a suitable diaphragm to which the stylus is connected, and

2. Operating the stylus by an electrical device whereby the power available by reasons of the sound striking a suitable diaphragm may be increased any desired amount.

Mechanical recorders have been known and used for many years. This method is inefficient in connection with sound pictures, for the sound must be made directly in front of a suitable horn and even then the technical difficulty in recording the music from an orchestra or outdoor sounds makes it extremely hard to obtain satisfactory records.

The electrical method eliminates the necessity of grouping the artists very closely about the recording horn and makes possible the recording of outdoor events which are practically impossible to record with a mechanical recorder.

This method is apparently satisfactory from a practical standpoint, and aside from some difficulty in obtaining proper balance from various instruments in an orchestra, the control is greatly simplified.

(*To be continued*)

The Selenium Cell Surprises Its Critics

We are advised by a number of experimenters with sound motion pictures that the selenium cell as a means for converting light variations back again to sound variations is "a thing of the past." We pressed several of these workers in the art for the facts upon which they base their conclusions, and we are told that the selenium cell has a considerable inertia period which is detrimental to the best functioning of an efficient sound picture system.

In an endeavor to ascertain whether or not such is the case, the writer made up a number of selenium cells and submitted them to unbiased and capable engineers for opinions. We were happily surprised to learn that none of the engineers commented on the inertia period of the selenium cell. This, then, proved one thing: that those who had complained of the inertia period did not have an opportunity of trying the selenium cell, and that they simply repeated the idea, not based on fact, but which has been subject to such repetition that it is regarded as fact.

Selenium Output Greater

It is interesting to note here that if a selenium cell is carefully made, it will give *considerable more output* (milli-watts), as a result of illumination than will a photo electric cell (micro-watts). This, then, obviously means that a talking motion picture amplifier would require a considerably smaller amplifier unit and be immeasurably less difficult to make. A further consideration is the fact that the selenium cell can be proved to be free from patent litigation, a subject which is worthy of and shall receive attention in a special article in an early issue.

In the experiments conducted with the selenium cell, when such a cell was connected into a circuit which was designed for the use of a photo electric cell, the selenium cell delivered such output as to necessitate a considerably lower fader setting in order not to overload the amplifier. This, to our mind, was conclusive proof of the efficiency of the selenium cell.

Requires Proper Circuit

Only one difficulty was experienced during the experiments, i. e., the higher notes could not readily be reached with the selenium cell in the circuit, and we attribute this to the fact that it was being used in a circuit designed primarily for photo electric cell use. It is reasonable to expect that some minor changes would have to be made for the use of selenium, and these changes would undoubtedly eliminate the above mentioned difficulty.

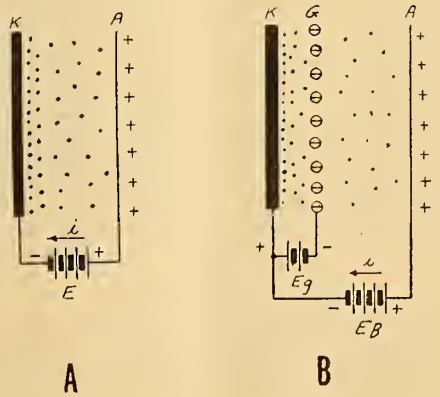
The best results obtained with the selenium cell were when a potential of 4 to 22½ volts was applied; contrast this to the photo electric cell experiments where considerably more than 110 volts was used. At a later period we shall present further detailed facts as to the conditions existing during these experiments, with the hope that other experimenters may contribute their opinions and thereby effect some improvement, however slight, in the projector sound head.

We should like to add that there are now more than twenty motion picture theatres equipped with selenium cells and proper amplifiers as part of an extensive experiment to ascertain from actual working conditions a basis of comparison between the selenium and the photo electric cell. The result of these tests, which are sure to be most interesting, will be presented in these columns when available.

Effects of Vacuum Tube Grids*

THE currents indicated by arrows in Fig. A is the electron stream and not the conventional current, as is clearly indicated by the direction. The scheme indicated in Fig. A is that of the diode, or two-element tube, first put to radio use by Fleming. It is used for detection and for rectification, as, for example, in B supply units in which the rectifier tube is of the filament type.

*Harrington J. Forbes in August, 1929, issue of *Radio World*.



Now let the arrangement in Fig. A be changed as shown in Fig. B. A grid, G, consisting of parallel connected together metallically, and indicated by circles, is interposed between *A* and *K*. The grid is kept negative with respect to *K* with the battery Eg, while the plate is kept positive with respect to K with the plate battery Eb.

Electron Action

Since *G* is negative with respect to *K*, it will repel the electrons shot out from *K*, and it will therefore aid *K* in pulling them back. The greater the negative charge, or potential, on *G*, the more effective will *G* be in repelling the electrons. Since *G* is a grid in physical structure, there are spaces where there is no repelling force and where electrons may get through if they come up with sufficient velocity. The electrons are aided to get through the open spaces of the

(*Continued on next page*)

Everyday Science

Sound Waves Are Used to Treat Deafness

FROM Russia comes a report of treating deafness by giving the ears exercise in responding to sound. The director of the deaf and dumb institute at Leningrad, Professor Skrizki, has been working for three years at the institute with several pieces of apparatus which he has developed.

The procedure is first to record the ability of an individual to catch any sounds, high or low. Apparatus for this purpose registers sound waves that vibrate as slowly as 106 times a second. These waves produce extremely low pitched tones. From this point the apparatus registers waves up to 12,000 vibrations a second. If the hearing of the patient responds to any of these vibrations, sound waves of increased intensity are transmitted to the ears of the patient through ear phones. The effect is described as being like a curative massage, stimulating the auditory nerve into activity.

30,000 Vibrations a Second

A German engineer has developed a method of treating chronic deafness by sound waves that vibrate so rapidly they are inaudible to human ears. The usual frequency, he states, is 30,000 vibrations a second.

Such experiments are beginning to attract attention in this country, and specialists are receiving eager inquiries. So far, these experiments have not been duplicated in this country and reported upon.

New Machine Would Make Man Weigh 7,000 Tons

A device that increases the effective force of gravity over a hundred thousand times, so that an ordinary 150-pound man would weigh more than seven thousand tons has been described to the American Chemical Society by Dr. Theodor Svedberg and Mr. J. B. Nichols of the University of Upsala, Sweden. If a real man were exposed to the enormous force of this machine he would be mashed flat instantly by his own weight. The machine is a new type of rotating centrifuge, spinning at the record speed of more than forty thousand revolutions a minute. The force which it exerts is centrifugal force.

Hydrogen Gas Chamber

Machines which spin at such enormous speeds as this not infrequently burst of their own accord, a result of the vast centrifugal forces set up inside the structure of the machine. This difficulty Dr. Svedberg and Mr. Nichols have managed to avoid by a special design. The machine is driven by an oil turbine. If run in air, it heats up instantly merely by air friction. In use it is spun in an atmosphere of hydrogen gas, which carries away the heat faster than air will do.

The device has been used to study the effects of these enormous centrifugal forces on molecules in solution in water, on suspended droplets of oil or other substances and on the chemical behavior of the red coloring matter of the blood.

Newton's Work on the Composition of Light

WHEN he was born he was so little "they might have put him in a quart mug"; when he died, among thinkers he was the biggest in the universe. Prematurely born to his widowed mother, on Christmas Day in 1642 Isaac Newton first saw the light, which was to be his constant study in later years. A kick given to him by a school-mate first aroused his taste for study. He set out to eclipse the other lad in his studies by way of retaliation for the assault.

He was twenty-four when he made his first great discovery—that light consisted of rays which vary in refrangibility as they vary in color. By noting how light of one color, passing through water or glass, focussed at a different point than light of another color, Newton proved that light is not all alike in nature; it separates into rays of characteristics differing with the colors they produce.

Demonstrated Color Prisms

He mixed painters' colors on the floor of his room till he obtained a dun or skin color, placed a piece of white paper beside them, regulated the light on each, and a friend entering the room pronounced the two exhibits a perfect whiteness. By this experiment he showed white light to be composed of seven prismatic colors.

Through his disclosure of the different focal points of different colored rays, he saw that the telescope had to have lenses changed and added to bring these rays, different in their bending-angles, all to focus at a single point. He thereupon built with his own hands the first practical reflecting telescope. With this improved instrument astronomy made tremendous strides and the heavens revealed more of their wonders.

Dismiss W. E.-Pacent Suit

By a decision in the United States District Court, Southern District of New York, filed recently by District Judge Frank J. Coleman, the second attempt of the Western Electric Co., Electrical Research Products, Inc., and American Telephone and Telegraph Co., to establish patents alleged to be involved in the manufacture of competitive talking picture equipment was dismissed.

---

grid by the fact that the positively-charged plate acts through the openings, attracting the electrons.

Once an electron has passed through an opening in the grid, it is not only attracted by the plate but is pushed in the same direction by the repulsion of the grid. It is only those electrons which are projected from the cathode with the highest velocities that are able to overcome the combined attraction of the cathode, the repulsion of those electrons farther away and the repulsion of the grid.

If *G* is maintained at a sufficiently high negative potential, for a given cathode temperature and a given plate potential, all the electrons emitted are repelled so that none can get to the plate. This condition obtains when the negative grid voltage multiplied by the amplification factor of the tube is greater than the voltage of the plate battery. Then there is no plate current.

The Question Box

The question box will be an adjunct to this department, and in it will appear the answers to questions which are submitted by our readers. Questions having to do with any one of the many subjects listed in the June issue as topics for discussions in this department, may be submitted and will be answered in The Question Box for the succeeding issue.

Photo Electric Cells

H. B., Brooklyn, N. Y.

Question: By accident I broke the photo electric cell. The replaced cell I found functioned best on considerably higher voltage. Since then I have tried other cells, and each one operated on a different applied voltage. Why is this?

Answer: Photo electric cells today are made in the laboratory, by hand. Too many physical discrepancies are involved in its manufacture and, accordingly, the physical characteristics of each cell differ, thus the operating voltages are different.

"Squealing"

J. C. D., Akron, Ohio.

Question: At times the loudspeakers backstage give rise to a shrill note. What do you recommend to stop this?

Answer: This is undoubtedly due to stray A.C. picked up by the amplifiers. This can be remedied by putting metallic caps over the amplifying tubes. These caps behave as shields for each tube.

Potentiometer

N. N., Salamanca, N. Y.

Question: What is the function of a potentiometer?

Answer: A potentiometer is a variable resistance having three terminals. Its purpose is to secure a high or low potential in another electrical circuit.

Exciting Lamp Potential

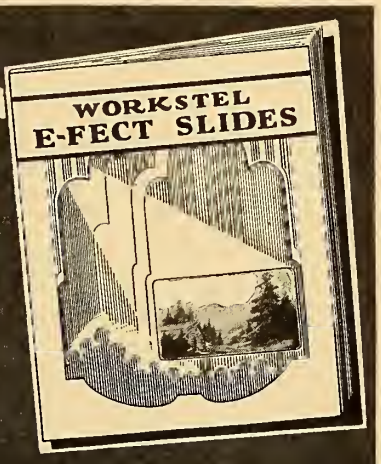
A. F., Portland, Oregon.

Question: Is it possible to provide a source of supply for the exciting lamp other than storage batteries?

Answer: This matter is discussed elsewhere in this department.

The queries of J. L., Cleveland, Ohio; E. M., Toronto, Canada; F. J. M., San Francisco, and L. P., New York, are answered in the discussion of television which appears elsewhere in this department.

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Remove E-16 Film Trap from mechanism. Remove idler from top sprocket and latch which holds film gate open. Remove screw from focusing rack fastened to A-4 lens holder. A-4 assembly can then be removed by sliding out the rear of mechanism. Remove parts on the E-16 and A-4 and place those needed on the Film Trap and Adaptor Holder we furnish. Then fit Adaptor Holder and Film Trap to projector.

DIRECTIONS FOR INSTALLING LENSES

Place your regular projection lens in Adaptor marked D. Tighten screws which hold lens. Place lens with adaptor in the Adaptor Holder so that the locating pin on Adaptor engages in hole in holder. When in place, tighten knurled knob. The D on Adaptor will then be matched with the DISC on name plate. Place standard aperture in position and project a light on the screen and center projector. Project a test film (titles) and focus in the usual way. When in focus remove lens with adaptor from the projector.

Place adaptor marked F in holder and tighten. When in place the F will match with FILM on name plate. Slide lens of ¾ inch shorter in adaptor. Slide sound track aperture in position. Project test film and focus. DO NOT FOCUS WITH REGULAR ADJUSTMENT but by sliding lens in adaptor. Tighten set screws when in focus. If picture is not properly centered on screen shift lens up or down in its adaptor by tightening the screws in one place and loosening in another. When in focus and centered properly tighten all screws. Your picture will now be of the same screen area whether you are projecting sound on film or standard film by changing from one combination to the other without re-focusing. By the use of extra adaptors lenses can be set for Magnascope and other effects. Write for illustrated circular.

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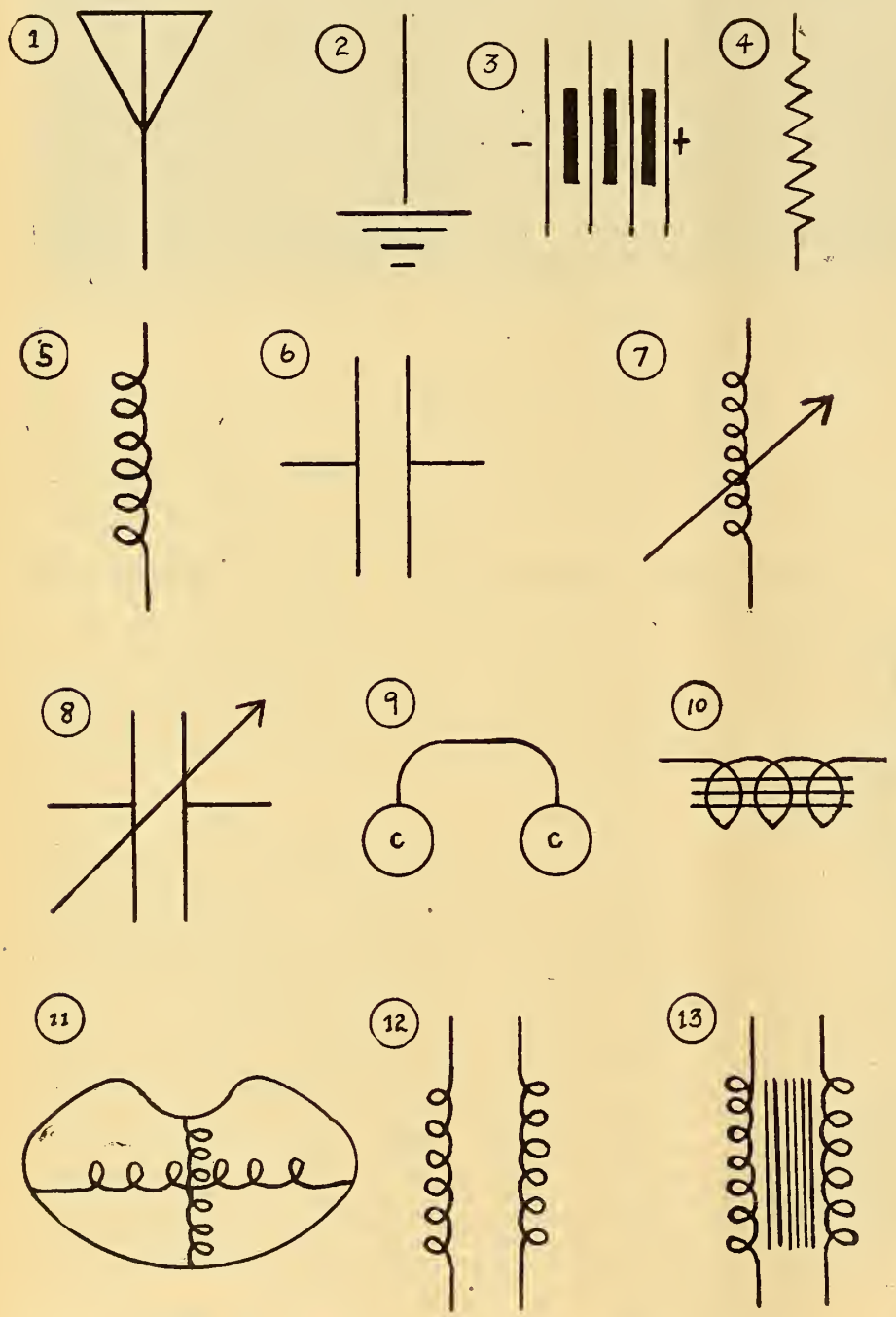
262 WYCKOFF STREET *Manufacturers of Motion Picture Accessories Since 1913* BROOKLYN, N. Y.

The Sentry Safety Control

By W. J. HAGERTY
Sentry Safety Control Corp.

ALL fire hazards on a motion picture projector are caused by the stoppage or piling up of the film at or near the aperture when exposed to the intense heat from the lamp for a period longer than 1/2 second. Film when in good condition and with the projector operating at normal efficiency, passes through the mechanism with an intermittent movement at a speed of 90 feet per minute. Due to the intermittent movement of the film at the aperture, the film remains exposed to the ray of light for 1/24 of a second. This brief exposure of the film allows a sufficient margin of safety to prevent combustion or ignition of the film, which will occur in an exposure period of from 1/5 to 1/2 second. Heat at the aperture varies from 1,000 to 1,450 degrees F., depending upon the type of lamp and quantity of amperage used.

When the film is interrupted while passing in front of the light rays for a period longer than 1/2 second, combustion or ignition occurs so quickly that it is humanly impossible to prevent a fire. Sentry Safety Control is designed to eliminate this constant threat to the projectionist by automatically stopping the film when it is exposed before the light for a period longer than 1/10 of a second. Sentry operates in that space of time, first by cutting off the light and then stopping the mechanism.



1.—Aerial. 2.—Ground. 3.—Battery. 4.—Resistance. 5.—Coil. 6.—Condenser. 7.—Variable (tapped) coil. 8.—Variable condenser (changeable capacity). 9.—Headphone. 10.—Choke coil. 11.—Potentiometer. 12.—Air-core transformer. 13.—Iron-core transformer.

Main Causes of Fire

A fire hazard is immediately created on a motion picture projector from any one of the following causes:

1. Jamming of the mechanism due to: (a) lack of proper oiling, (b) broken gears or parts, and (c) failure of take-up mechanism.
2. Interruption of motive power due to: (a) broken belts or chains, (b) failure of clutch, (c) blowing of fuses, and (d) extreme drops in motor supply voltage.
3. Poor condition of film: (a) film breaks, (b) running off sprockets, (c) torn sprocket holes, (d) loose patches, and (e) improper threading. Sentry is so designed that it automatically and instantaneously detects any of the above conditions and functions so quickly that the fire hazard is eliminated.

Sentry Safety Components

Sentry Safety Control consists of the following units: Douser, upper loop switch, lower loop switch, rotary switch and main control box.

The douser switch unit is mounted on the cone of the lamphouse. Its function is to start the projector through a remote control system, and also to cause the douser plate to fall, cutting off the light when the emergency arises. This douser is instantaneous and positive in action.

The upper loop switch is mounted adjacent to the sprocket which feeds the upper loop and is so arranged as to detect either an increase or loss in the top loop of film passing through the machine. A plate deflector is also placed in such a position as to prevent the escape of film after a break occurs at the top sprocket.

The lower loop switch unit is mounted near the film trap where the film enters the lower magazine and is equipped with an idler arranged to ride the film during the operation of the machine. Failure of the film to support this idler causes the switch to operate.

The rotary switch is driven direct from the projector mechanism and functions when the speed of the projector decreases to a predetermined degree.

The main control box unit, houses the motor control equipment and serves as a junction box for all switch wires. The contacts carrying the motor current have a capacity of thirty amperes. Margin of safety here is evident from the fact projector motors are rated five amperes or less. Silver is used for the contacts of all the switches.

Operating Detail

The Sentry Safety Control is subject to a dielectric strength test of 1,250 volts and overload test of 150 per cent rated current. The heart of the Sentry Safety Control is the douser head which is held open by an electro-magnetic force and closes by gravity, thus should even the Sentry mechanism fail to work from any cause,

W. E. Develops Special Apparatus for Hard- of-Hearing Moviegoers

THE Paramount Theatre, a Publix unit in Brooklyn, N. Y., has recently made provision for the enjoyment of sound pictures by those of its patrons who are hard-of-hearing by installing special apparatus in a certain block of seats which are at all times held in reserve for this particular class of patron. The apparatus for this special service has been developed by Western Electric and may be had by any theatre desiring it. A description of the apparatus and the manner in which it is used follows.

This equipment consists of a number of telephone sets having individual volume control and an amplifier which taps off a small amount of energy from the sound projector system and in turn supplies energy to the seats at which telephone sets are to be used.

Means of Sound Control

The amplifier, which is a Western Electric 25-C type, is operated from the A. C. power supply. This amplifier is controlled by the master switch controlling the sound projector system when the power supply lead of the 25-C amplifier is plugged into either the regular or the emergency outlet corresponding to the sound projector amplifier being used. A switch in the power supply cord of the 25-C amplifier may be used to disconnect it from the sound projection system.

A key marked "R" and "E" signifying regular or emergency system is mounted on a panel placed adjacent to a similar panel control for the sound projector system. By throwing this key the 25-C amplifier is connected with the particular sound projector system designated.

Special Wire to Seats

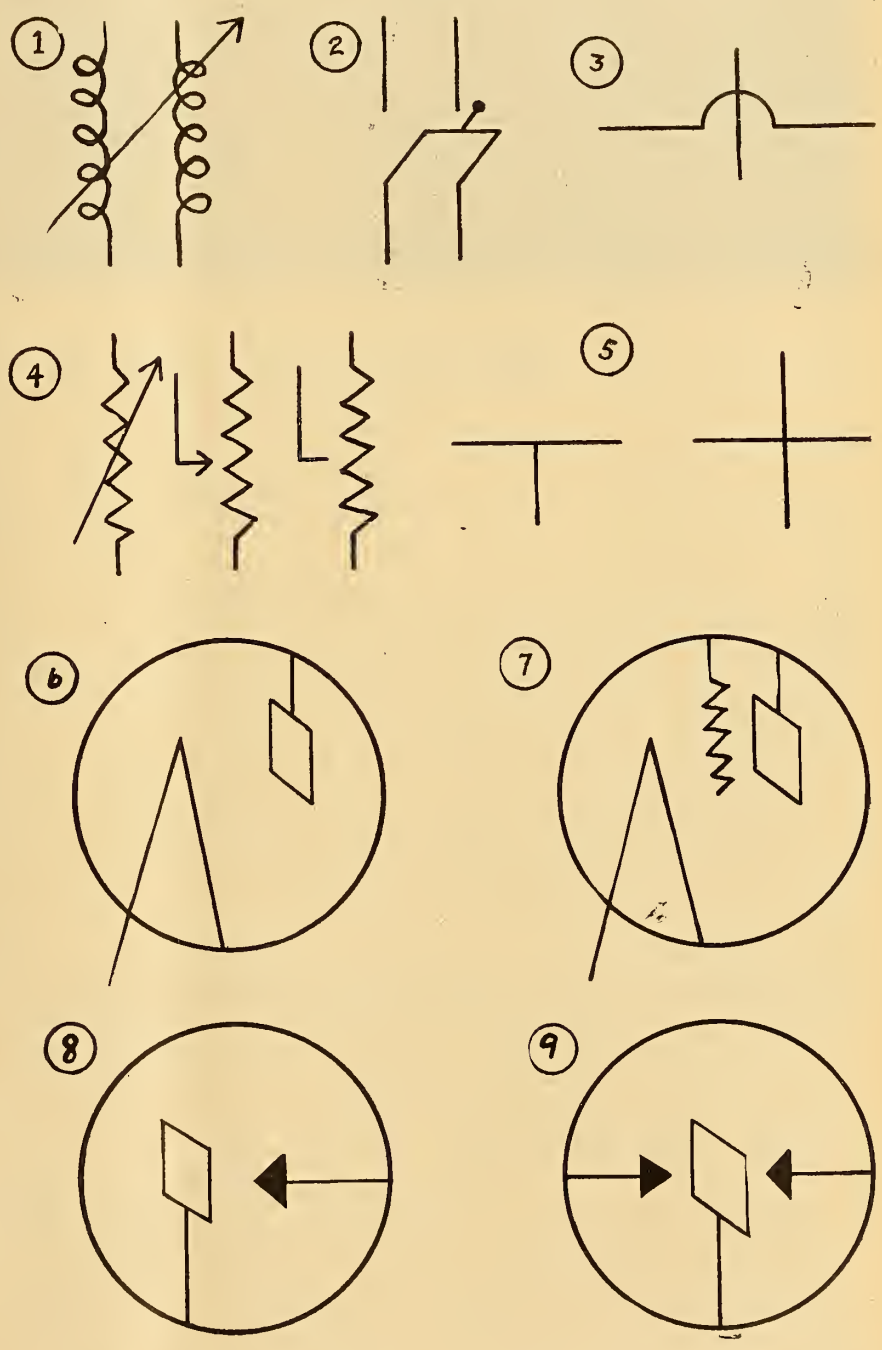
The output of the 25-C amplifier is wired to the seats intended for the hard-of-hearing. Mounted on the back of each seat so wired and just under the right arm of the seat, is a jack for connecting the telephone set with its amplifier. Metal molding is used to cover the pair of wires running along the row of seats. Flexible Baby BX cable connects the jack with the leads in the metal molding.

The telephone set consists of a small receiver with a head band attached to hold the receiver to the ear, and a small volume control attached to the receiver cord. By inserting the plug of the telephone set in the jack mounted on the back of the seat the telephone set is ready for use.

Careful Handling Essential

The utility of a system such as this will depend as much on how it is used as on the general design of the system itself. To emphasize some of the more general features of this system, the following precautions to be observed in the operation of the system are outlined below.

The telephone set is connected with the seat jack only while in use. Care must be exercised in handling the telephone set to prevent tangling of the cord, etc. The sets should be either hung up individually with the cords folded or else stored in separate compartments with the cords coiled around the receiver and head band.



1.—Variable transformer. 2.—Switch. 3.—Wires cross but do not join. 4.—Variable resistance (tapped resistor or rheostat with movable charger. 5.—Wire joint. 6.—Two-element tube with filament and plate. 7.—Three-element tube with filament, plate and grid. 8.—Rectifier tube, single or half-wave rectifier. 9.-Rectifier tube, full-wave or completely rectifying.

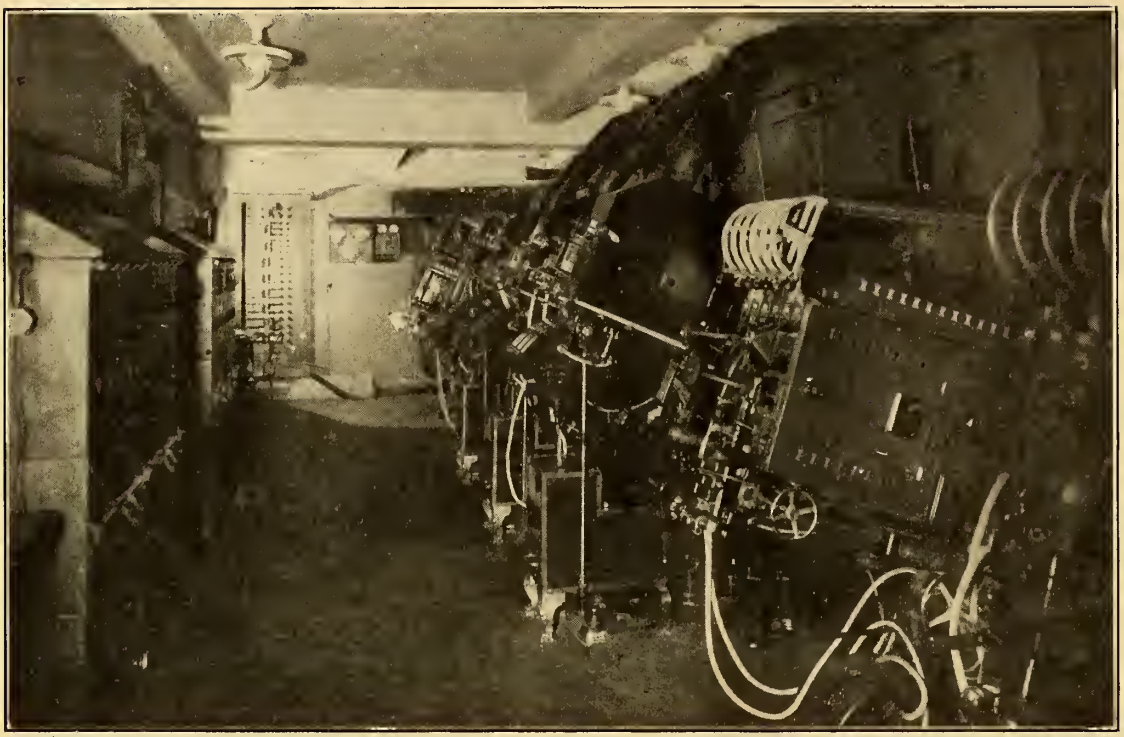
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the magnetic force is interrupted and the douser will fall by gravity.

Sentry is absolutely safe and certain. A projectionist must have his film properly threaded through the projector and all parts of the projector and Sentry device properly set before he can get light on his aperture. This action is due to a special brake inserted for additional protection. A projectionist cannot forget any detail because Sentry automatically checks his work.

Check on All Wiring

Sentry also acts as a check on all wiring and electrical devices entering into the projector and will instantly show any short circuits or similar irregularities if they are present. The arc on any Sentry switch contact is very slight since the exciting current is 0.4 of an ampere. At no time does the current drawing the motor pass through the switches on the head of the projector.



View of the projection room in the Paramount Theatre in New York City, one of the finest projection rooms in the world bo h from the standpoint of layout and equipment. Film cabinets on rear wall open into rewind room and are vented to outside air. Equipment and layout plans for this room by Harry Rubin, Supervisor of Projection for Publix Theatres

Elementary Electricity

By ELLIOT STRICKLAND

I. Forms of Electricity—Atoms and Electrons—Measurement of Electrical Potentials—Conductivity and Resistance

ELECTRICITY may be said to be of two distinct sorts or classes—namely, *static* and *dynamic*. In strict accuracy these two classes cannot be said to differ in any way other than in the difference between a force at rest and a force in action, because electricity does not differ under these distinctions except insofar as its state of rest or action is meant. Static electricity means a power at rest, and under this term is considered the storing of a force in a state of rest as opposed to electricity in a state of activity. Dynamic electricity is, therefore, the same force with similar characteristics, but in a state of activity, or in the condition of performing work.

Eletrostatic charges are created by friction, as, for example, rubbing a glass rod, sealing wax or some similar material with a soft pliable material. Two distinct kinds of electrostatic charges are made when two dissimilar substances are rubbed together. One is known as a *negative* charge, and the other is known as a *positive* charge.

Positive and Negative Charges

This explanation may best be illustrated by the classic experiment with the pith ball, suspended in the air by a thread, and a glass rod, charged by rubbing it with a silk cloth. The pith ball, if allowed to touch the glass rod, will be attracted toward the latter. Some of the electrostatic charge which accumulated on the rod will leak off, to be absorbed by the pith ball. It will be noted that as soon as the pith ball has accumulated a certain definite quantity of this charge, it will suddenly be repelled, indicating that it now has an electrostatic charge similar to that of the glass rod.

The electrostatic charges formed on the glass rod, when it was rubbed with silk, are arbitrarily called positive; the charges which are formed on the silk are called negative. Different substances take different kinds of charges: some take negative and some positive charges. Only one kind of charge can be present in any one substance; neither charge can be formed without the presence of the other.

To sum up the conclusions arrived at from this important experiment, it will be noted: (1) when a body which has not been electrified comes in contact with an electrified body, the former becomes electrified with a charge similar to that of the latter; and (2) when two bodies become similarly charged, they repel each other, and when they are oppositely charged they attract each other.

Atoms and Electrons

All matter may be chemically classied, one unit of which is called *atoms*. All atoms consist of a mass of positively-charged electricity, and it is conceded that each atom has colleted around itself a certain definite number of *electrons*, which are small particles of negative electricity, which thus serve to balance the positive charge of the atom.

From this we conclude that a body which is positively charged is short of electrons and endeavors to draw toward it any electrons or negatively-charged particles which may be in its vicinity. Conversely, a negatively-charged body has an abundance of electrons and for this reason will tend to get away from any other electrons which may be near them or come their way, according to the theory previously mentioned. The body having the negative charges will tend to move toward the positively-charged body.

Current Flow

It is an established fact that the electrical conditions which is called positive is of a higher level than that which is called negative, and that electricity tends to flow from this higher, or positive, level to the lower, or negative, level. It has been proven conclusively that the flow of electrons is directly opposite to that of the flow of electricity—that is, electrons flow from a negative body to a positive body.

Electricity is measured by the amount of work it does. If one were to take a vessel filled with a solution in which some metal had been dissolved, placing in this vessel two electrodes, and then cause electricity to flow through the electrodes, some of the metal in the solution would be deposited on one of the electrode (cathode)—the quantity of metal deposited being directly proportional to the quantity of current flow.

(*Continued on page* 28)

Special Equipment for Sound Pictures

(*Continued from page 7*)

cell, although no more sensitive to all light, may have an apparent sensitivity several times greater in sound picture service.

Other very important requirements are freedom from noise due to leakage between the elements themselves. Even very slight leakage, unmeasurable except with the most delicate instruments, will cause a veritable roar in the output of an amplifier, which has a gain of 125 decibells, or roughly equivalent to a good-six-stage audio amplifier.

For the same reason, the photo electric cell must be free from microphonic disturbances which sustain an osciallation



D. E. REPLOGLE

Brilliant engineer who has made many important contributions to the development of the photo electric cell.

that manifests itself as a squeal or howl when the apparatus is jarred. As the cell is positioned on the projector proper, which is subjected to more or less vibration, this feature becomes more important.

Manufacturing Standards

Above are a few of the details in development and manufacture of photo electric cells that are being solved in order to bring to a state of perfection this most important unit of the sound picture apparatus. To achieve the desired results, many little known and little thought of elements and chemical combinations of elements are being minutely examined.

Hand in hand with the physical and chemical research goes the study of achieving better mechanical ways of making cells, with a view to reducing their cost and increasing their uniformity and utility. Processes are now being developed so that the long, laborious hand methods will soon be superseded by automatic methods similar to those used in making radio tubes, and special cells will be available for a given purpose that are most efficient for that purpose.

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Elementary Electricity

(*Continued from page* 26)

The unit called the *columb* is the quantity of electricity that deposits a certain amount of metal, irrespective of the time required. The unit called the *ampere* is commonly known as the rate of flow of electricity and is equal to the rate where one columb flows per second. The strength of an electric current expressed in amperes always indicates the flow of a definite quantity in a second. With respect to amplification this unit has been subdivided into:

$$\text{Milliampere} = \frac{1}{1{,}000} \text{ ampere,}$$

$$\text{Microampere} = \frac{1}{1{,}000{,}000} \text{ ampere, or}$$

$$\frac{1}{1{,}000} \text{ milliampere}$$

The unit of resistance of a conductor is called an ohm, and depends on the make-up, size and shape of the material of the conductor. In amplification work this unit is subdivided as follows:

$$\text{Microhm } \frac{1}{1{,}000{,}000} \text{ ohm}$$

and is used os a unit for small resistances.

Megohm 1 ohm x 1,000,000

and is used as a unit for high resistances.

This electrical current is measured by means of an instrument called an ammeter. The ammeter is always connected in series in the circuit. The unit called the *volt* is the practical unit of electromotive force (E.M.F.), and is the force which will cause electricity to flow at the rate of one ampere through a circuit having a resistance of one ohm. This unit has been divided for convenience into volts and millovolts:

$$\text{Millivolt} = \frac{1}{1{,}000} \text{ volt}$$

$$\text{Microvolt } \frac{1}{1{,}000{,}000} \text{ volt, or } \frac{1}{1{,}000} \text{ millivolt}$$

This voltage is measured by an instrument called the voltmeter, which when connected across a circuit will indicate the voltage between the points on the line to which it is connected.

The unit *watt* represents the amount of

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work done in a given unit of time. The power in watts equals the product of the current in amperes multiplied by the volts in the circuit. This unit is also divided:

Kilowatt = 1,000 Watts
Horsepower = 746 Watts

The watt hour and the ampere hour are a direct measure in the first instance of electric work done by 1 watt in 1 hour, and in the second instance of current or amperes used for 1 hour.

In an electrical circuit there is a distinct relationship existing between volts, amperes and resistance. This relationship, first expounded by Dr. Ohm, is known as Ohm's Law and manifests itself wherever electricity is used. The law is formulated as follows:

$$1\ \frac{E}{R},\ E = \frac{I}{R},\ R = \frac{E}{I}$$

Where I equal current in amperes, E equals the E.M.F. in volts, and R equals the resistance in ohms.

Conductivity and Resistance

Materials are either good conductors or bad conductors of electricity, but it is well to remember that *all* materials conduct a certain amount of electricity. A good conductor of electricity is any substance that will allow a current of electricity to flow through without offering a great amount of resistance. If the opposition to the flow of electricity is so great that practically none can flow, the substance is an insulator or non-conductor.

The total resistance of the different conductors which are connected in *series* in a circuit is equal to the sum of such resistances: for example, if the resistance of A were 5 ohms and the resistance of B were 7 ohms, the total resistance would be 12 ohms. The current flowing in any part of the circuit would be the same.

The total resistance of the different conductors which are connected in *parallel* may be found by the following equation:

$$R = \frac{1}{\frac{1}{r_1} \quad \frac{1}{r_2} \quad \frac{1}{r_3}}$$

or R equals the total resistance.

For example, in a parallel circuit, let resistance A equal 5 ohms and resistance B equal 10 ohms. Thus:

$$R = \frac{1}{\frac{1}{5} + \frac{1}{10}},\ \frac{1}{5} + \frac{1}{10} = \frac{3}{10},$$

$$R = \frac{1}{\frac{3}{10}} = 0.3,\ R = \frac{1}{3} = 3\frac{1}{3} \text{ ohms}$$

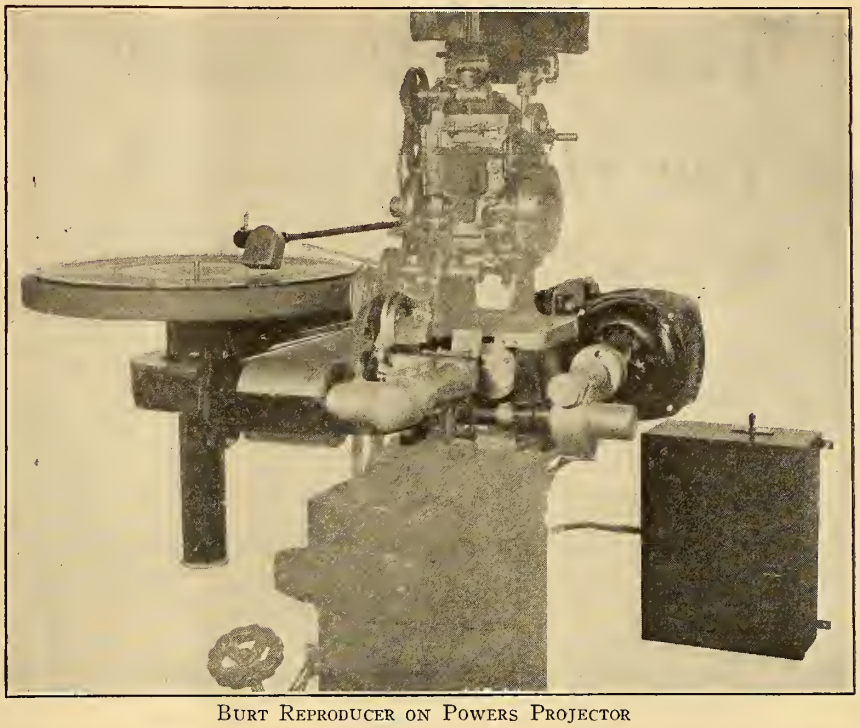
If the values of A and B were equal, say, each 10 ohms:

$$R = \frac{1}{\frac{1}{10} + \frac{1}{10}} = \frac{1}{\frac{2}{10}},\ R = 0.2 = 5 \text{ ohms}$$

It will be seen from this example that if two or more conductors of the same resistance were connected in parallel, the total resistance would be equal to the resistance of one conductor divided by the number of such equal conductors which are connected in parallel. herefore the foregoing equation will apply whether the individual resistances are equal or not.

(To be continued)

THE BURT REPRODUCER
FOR TALKING MOTION PICTURES



BURT REPRODUCER ON POWERS PROJECTOR

Features

SYNCHRONOUS MOTOR DRIVE (110 or 220 volts, 50 or 60 cycles). Prevents variation in speed from variation in line voltage, or projection load.

THE SUPER CELLS used require only two stages in head amplifier, hence less distortion.

EASE OF THREADING. When running disk or silent, the Sound-on-Film unit is not threaded. Sound-on-Film threads as easily as through a Powers gate.

TURN TABLE IS ACCESSIBLE, being up high at the side of the machine.

EASY TO INSTALL. Installation can be made by the ordinary operator, and wire man.

PROJECTOR HEAD is driven by its main drive gear and is not required to drive any part of the sound equipment.

ONLY THREE SHAFTS: (1) Motor Drive Shaft, (2) Sound Film Shaft, (3) Disk Table Shaft.

VARIABLE SPEED can be used for making schedule by driving the head off the Powers Motor, when running silent. Change from synchronous drive to variable speed drive requires about ten seconds.

No UNIVERSALS—No flexible couplings, flexible shafts, or long unsupported shafts are used, as these produce tremolo.

FIRE HAZARD IS DECREASED by use of this equipment. Failure of take-up does not cause film to pile up in light.

Write for Bulletin No. 291

Manufactured by

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S. M. P. E. Fall Meeting

L. C. Porter, President of the Society of Motion Picture Engineers, announces that the Board of Governors has decided to hold the next meeting of the Society in Toronto, Canada, October 7 to 10, inclusive. Canadian and other members of the S. M. P. E. have been making an insistent demand for a Convention to be held in Canada as none have been held there since the one in Ottawa, October, 1923.

As the Spring meeting held in New York last May was highly successful from every standpoint, greatly increased the membership and made the industry much better acquainted with the activities of the Society, it is believed that the attendance will be very large at the coming Toronto meeting.

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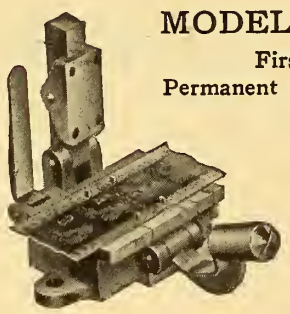
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Paramount Now Ready To Show Wide Film

FURTHER details of the new wide film which Paramount has already demonstrated in New York and which is scheduled to have a public showing on Broadway this Fall are supplied by Lorenzo Del Riccio, technician at the Long Island studios of this company, who is now on the West Coast seeking further data on production methods with an eye to improving his process. Del Riccio is credited with the Magnascope, which was first used in presenting full screen sequences of "Old Ironsides." However, Magnascope was only a method of magnifying the picture, whereas the new development is actually a larger film.

56 x 20 mm. Film

The actual enlarged film picture is 56 millimeters wide and 20 millimeters in height, against the present proportions of a picture 35 by 18 millimeters. The height of the larger picture really takes up no more film than the smaller one, as Mr. Del Riccio explained that he has utilized two millimeters that were lost in the smaller picture. This wide film will be projected on a screen 20 by 40 feet.

When Del Riccio went to work on this project, he was told by Jesse Lasky that there were three important points he must bear in mind. First, his enlarged screen must in no way interfere with sound equipment. In the second place, he must project a picture that would be entirely visible to spectators sitting under the balconies. Finally, there must be a minimum of changes in the theatre projection equipment.

Del Riccio has obeyed these instructions and, so far as the third point is concerned, he said yesterday that only eight slight changes were necessary.

The Paramount Studio has already produced a four-reel talking picture with the wide film. It is called "You're in the Army Now," and Del Riccio is satisfied with the results. He said, however, that in the first part of this film the corners of the picture were not quite sharp, a failing which was due to the manipulation of the camera. This fuzziness was corrected in the rest of the film.

New Projector Attachment

Del Riccio also declared that with an attachment called an anamorphosa, which costs only $30, he could produce on the present standard size film a picture which would give wide screen results. It is really only suited to the smaller theatres, for in larger theatres the results would not be as satisfactory as those with the wider film frame. On the film the anamorphosa gives a picture that is distorted, but when it is projected this distortion is no longer apparent. Del Riccio said about this:

"We have a line of chorus girls across a stage and two principals in the centre. The director has the 35-millimeter film in the camera that is set on the two principals. The number is sung and then the director desires to introduce the chorus. Without changing the position of the camera or lens the director can, by swinging the handle of the anamorphosa, cause the camera-angle to be increased until it includes the whole chorus.

"The wide film will necessitate a new

Wide Image on Standard Film

(*Continued from page 8*)

is long. This horizontal angle is somewhere in the vicinity of 100 degrees with a vertical angle of about 50 degrees. The standard motion picture, as projected today, appears almost square and this is one of the reasons why present pictures do not appear natural on the screen. The horizontal dimension is not correctly proportioned to the vertical height of the picture.

Scrapping Cost Enormous

In double-width film, with which some firms are experimenting, there are many disadvantages. With film of that width special equipment is needed from the start of manufacture of the film until it is shown on the screen. If this double-width film comes into general use it will require the scrapping of all the motion picture equipment now in use, with a cost of millions of dollars. It seems to me, after many years of experience in the film industry, that the scrapping of so much equipment is impractical.

However, a change in size of the picture is necessary. Also in the size of the sound track. The present size of the picture is not wide enough to give absolute fidelity of reproduction. Due to its narrow width any weaving of the film while passing the aperture which permits light to pass through the film to the photo-electric cell will cause a change of tone in the reproduced sound. This is often objectionable. The recording of the higher frequencies of sound presents another problem. This has only been partly solved. Sound engineers have increased the speed of photography from 18 to 24 pictures per second. This was done to give a longer sound track. At 24 pictures per second the film travels at the rate of 90 feet per minute, or 18 inches per second.

Recording Difficulties

When a ribbon light-valve is used with an aperture of .004 of an inch the highest frequency that can be recorded is 4/18.000 or 45.00. This is about the highest frequency successfully recorded by the variable density method. This comparatively low frequency cuts off many of the harmonics of speech and sounds. This gives rise to the complaints of "tinny or canned" music.

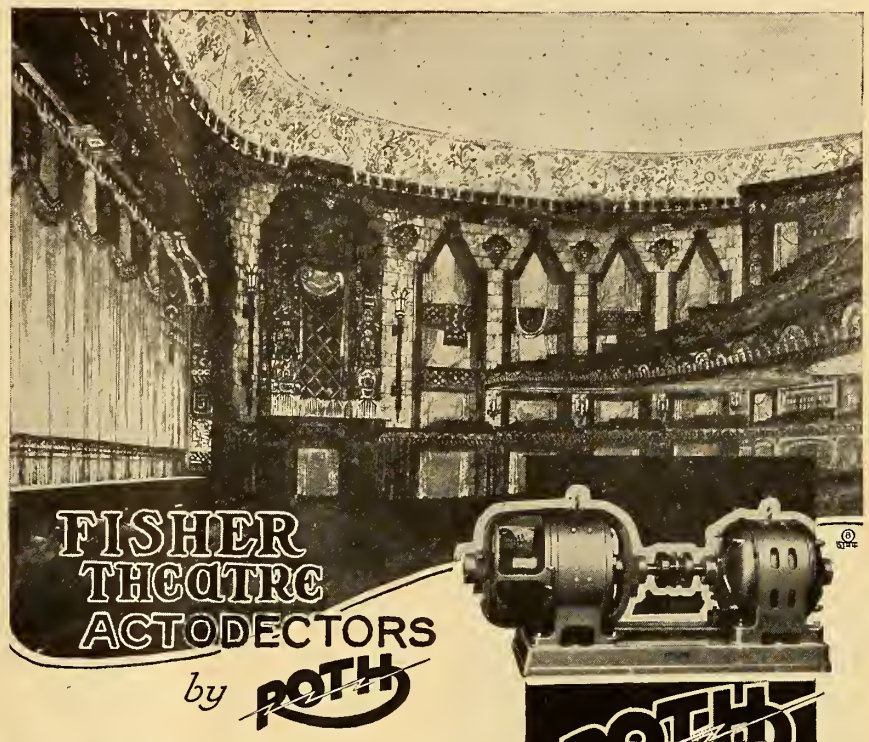
The use of double-width film only partly overcomes this difficulty, for although a wider sound track is used the film does not move at a much greater speed than the present film. To be exact, the increase in speed of the wide film is represented by the fraction .936/.750 which is not great enough to eliminate the present re-recording difficulty.

With my method this difficulty is overcome for it provides a sound track twice as long as at present, and at the same time gives an image twice as wide as the standard—and remember, it is on *standard* size film with standard machinery.

size film, new cameras, new screens in the theatres, the eight slight changes mentioned in the projection machines, new printing machines in the laboratories and alteration of other existing equipment.

"Its advantages are manifold, for it will mean that a screen as large as a stage is set before the audience and drama can be introduced into a scene without the necessity of so much cutting and changing as is the case at present. It will mean that the scenes will not be cramped as they are now and there, will be less necessity for close-ups."

"It has," said Del Riccio, "a greater angle for the camera rather than a greater magnification of the images."



THE FISHER THEATRE, Detroit, Graven & Mayger, Architects, was built by Fisher & Company who spared no expense in getting the finest equipment procurable.

It is significant that ROTH Actodectors—two of them to be exact—were chosen to furnish direct current for the projector arcs.

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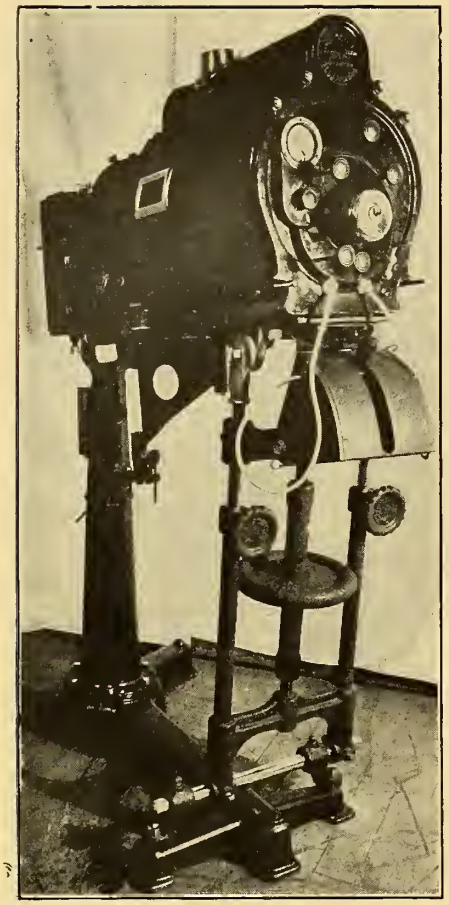
The Wonder Lamp

The following rather startling information recently appeared in one of the daily motion picture trade papers:

Through use of Mazda lighting, it is not necessary to use one-half as much illumination, as it was when hard lighting was in vogue, declares F. H. Cadenas, illuminating engineer of the National Lamp Works of General Electric, who says that increased illumination is not needed for sound film projection.

General Electric is making a special lamp for sound projection, having ten volts and 7½ amperes. It is one inch in diameter and about 3" long. The lamp is used for the De Forest and RCA-Photophone sound projectors.

The item about the new G. E. lamp will pass muster in projection circles, but there are undoubtedly many people interested in things projection who would like to know just why it is that sound pictures do not need increased illumination.



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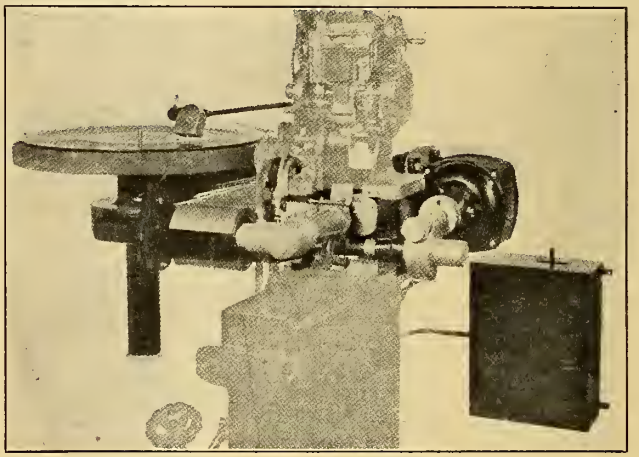
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THE BIOSCOPE PUBLISHING CO., Ltd.
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The Burt Reproducer

THE R. C. Burt Scientific Laboratories of Pasadena, Calif., has announced a synchronous reproducer for sound pictures. These reproducers are manufactured under the supervision of Dr. R. C. Burt, prominent in the electro-technical arts, and who is responsible for many important contributions to the commercialization of the photo electric cell. The Burt Reproducer has been adapted for both disc and sound film reproduction, the latter unit being unusually efficient.

The accompanying illustration shows the equipment to consist of a main frame, a one-piece casting which is bolted to the projector base. On this frame is placed a standard projector head. The lamphouse is raised a corresponding amount and this completes the mechanical installation. On the front of the main frame, at the right of the machine, is a self-starting synchronous motor. This motor drives a pair of spiral gears housed in an oil-tight gear case. These gears drive the main cross-shaft which carries the sound film sprocket and sound-film mechanical filter.



The Burt Reproducer attached to Powers projector. The regular projector drive is retained. Has a self-starting synchronous motor; only three gears and no flexible couplings.

Projector Drive Retained

From this shaft three idler gears connect the main transverse shaft with the projector head. The projector head is driven through its main gear drive gear, as it was originally intended by its manufacturer to be driven. This synchronous drive is accomplished without interfering with the regular projector drive, which is retained for the purpose of variable speed projection.

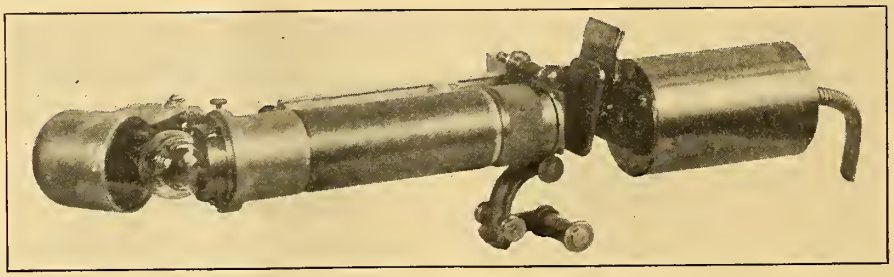
A simple mechanical clutch serves to throw in or out the synchronous drive used on sound film. The main cross-shaft is driven from the spiral gears previously mentioned by a positive slip clutch, the purpose of which is to hold tightly at all normal loads, thus keeping the projector up to speed, but to slip in the event that any part of the projector should bind or the film should jam.

The disc is driven through a large worm gear submerged in grease and is so mounted with springs and rubber cushions as to prevent any vibration from the projector affecting the disc. The tone arm support is also scientifically designed to eliminate any vibration affecting the disc pick-up.

Optical System

The optical system (illustrated), is extremely simple and accessible; the only adjustments required are when changing exciting lamps. Even the adjustment is rarely necessary, as the Burt Reproducer uses a standard automobile headlight bulb, manufactured under standardized conditions which locate the filament quite accurately. When using silent film or when using discs, the sound-film mechanism is not threaded, the film dropping directly from the lower sprocket into the magazine.

The photo-electric cells used have such a high output that only two stages of amplification are required in the head amplifier, which feeds through the fader directly into the power amplifier which may be any standard make of three-stage power amplifier. Two photo-electric cells are supplied with each head in one case, and in the event that one cell ceases to function the other may be put into operation by simply rotating the cell case one-half turn. No amplifier tubes are used in the cell case or on the machine itself. The wires from the photo-electric cells are

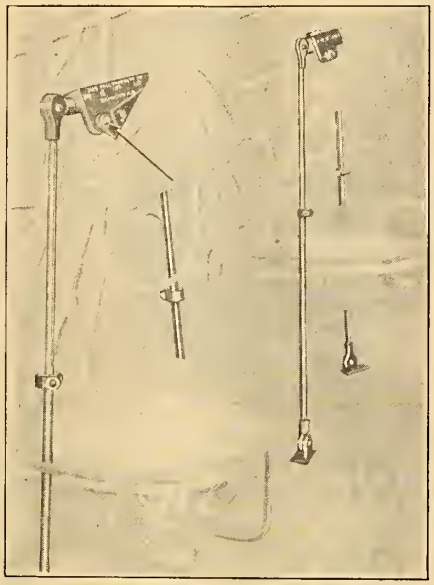


Optical system for Burt Reproducer

New Projector Bracket

BLUE SEAL PRODUCTS CO., INC., of Brooklyn, N. Y., is now manufacturing a Universal Support Bracket for the W. E. reproducer pedestal which is meeting with much favor among projectionists. The bracket is designed to eliminate all vibration from the projector when running sound pictures, and those theatres which have already installed the bracket report that it efficiently checks vibration and eliminates any trouble from that source.

This latest addition to the already extensive Blue Seal line of projection accessories is greatly in demand, being standard equipment on all reproducer units sent out by the Royal Amplitone Corp.



Blue Seal Projector Bracket

Easy to Install

The Universal Bracket is easily installed, and fits alongside the disc guard rail where it does not interfere in any way in the operation of the sound equipment. Directions for installing are as follows: Remove bolts from switch box casting, as shown by arrow in accompanying illustration. Place support bracket casting in position and replace switch box by using long bolts furnished. Assemble both legs to casting, placing the left-hand leg inside the guard rail and the right-hand leg outside the guard rail, both legs to be at a slight angle.

Mark for hole in floor casting and attach to floor, using screws and rawl plugs in cement floor. Tighten all bolts and screws, also the same on lamphouse castings. Proper installation will insure vibrationless projector operation. Descriptive matter on this bracket may be had from Blue Seal Products, Inc., Brooklyn, N. Y.

brought out to a jack which plugs into the head amplifier. Another jack on the disk pick-up arm plugs into the same head amplifier and thereafter control is had by means of the switch on top of the head amplifier. When this switch is in a vertical position everything is "off"; when switched to the left the disk is connected to the fader; when switched to the right the head amplifier filaments are lighted and the sound-on-film pick-up is connected to the fader.

A complete installation for talking motion pictures consists of two reproducers as previously described, and a two-way fader (not illustrated), together with a power amplifier and loud speakers of any standard make suitable for the particular auditorium. Auxiliary apparatus required with the reproducers for reproduction from film will be a six-volt storage battery for lighting the filament in the head amplifiers and a 45-volt B-battery; also a source of direct current suitable for lighting two automobile head lights. This we find convenient in most installations to take from the arc generator through a simple resistor.

Features of the Equipment

1. Synchronous motor drive (110 or 220, 50 or 60 cycles). Prevents variation in speed from variation in line voltage, or projector load. 2. Photo-electric cells used require only two stages in head amplifier, hence less distortion. 3. Turntable is very accessible, being up high at side of projector. 4. Easy to install. 5. Projector is driven by its main gear and is not required to drive any part of sound equipment. 6. Only three shafts: (a) motor drive, (b) sound film, and (c) disc table shafts. 7. Variable speed. 8. No flexible couplings, or long unsupported shafts are used, as these produce tremolo. 9. No fire hazard. Failure of take-up does not cause film to pile up at the aperture.

Local 650—Westchester, N. Y.

President Shaughnessy of Local Union 650 has appointed Brothers McClain and McCarthy to arrange for a series of lectures on the various units of sound picture equipment. Despite the fact that every sound installation is provided with an instruction book, President Shaughnessy holds to the view that much better results may be obtained with all equipments if the Local Union membership has the apparatus explained to them by representatives of the manufacturers, with the equipment under discussion to be set up in the instruction hall.

Form Projection Club

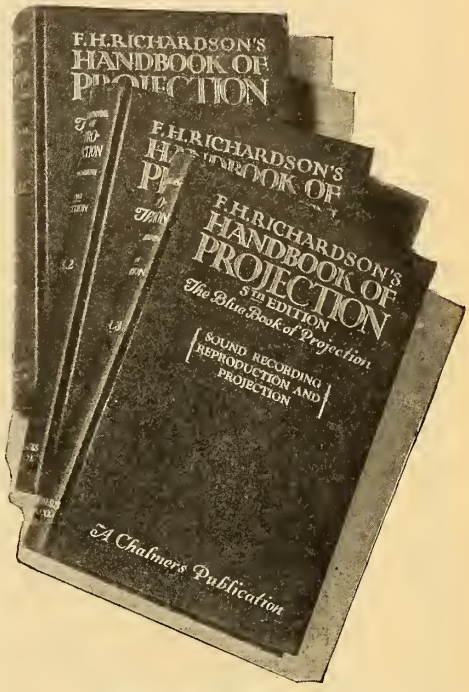
Manufacturers of both sound picture and other projection equipment will be invited to arrange for representatives to lecture on their equipments, and a full membership attendance is assured.

President Shaughnessy has the cooperation of all Local Union 650 officers and members in the plan. A Projection Club has been formed to sponsor the meetings and to further educational work in general among the membership.

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The Hertner Transverter

THE design of motor generator sets for the theatre has undergone a number of very marked changes which are due not so much to progress in the electrical industry, but to changes in the condition and demands of the theatre. Going back to the earliest day of the industry, the first electric arc used was carried on either a direct or an alternating current supply line, whichever was obtainable. With the former a rheostat was used for ballast; with the latter some form of choke coil was soon substituted for the rheostat.

The superiority of direct current over alternating brought about a call for a means of converting the latter and introduced into the field the mercury arc rectifier, the rotary converter, and the motor generator. Recently some experimenting has also been done with a commutator rotated by a synchronous motor.

The motor generator stands alone from the standpoint of performance and satisfaction. Its current is not only uniformly direct and constant, which is also true of the rotary converter, but it has the distinct advantage of being positive in its polarity and particularly of being much more independent of sudden line fluctuations.

Rectifiers, whether they are electro-physical, as is the mercury arc and the hot cathode type, or mechanical as is the synchronous commutator, are intermittent in their output, the current coming in surges, dropping to zero twice every cycle, producing more or less flicker and being susceptible to synchronizing with the shutter besides being extremely sensitive to line fluctuations.

Selling Projection

The exhibitor is selling projection. To be sure, the patron requires comfort, good chairs, lighting, ventilation, and cleanliness. Beyond this, he wishes to see the picture perfectly projected. Beautiful decorations are attractive, but they lose their drawing power for the individual in a short time. The new house with its super-excellent art effect will not bring the patron back night after night. It is the projection that exercises that power. In truth, such is its effect that the desire of the patron to visit such a theatre grows rather than diminishes with repetition.

The early type of generator was of the constant potential design, the voltage being

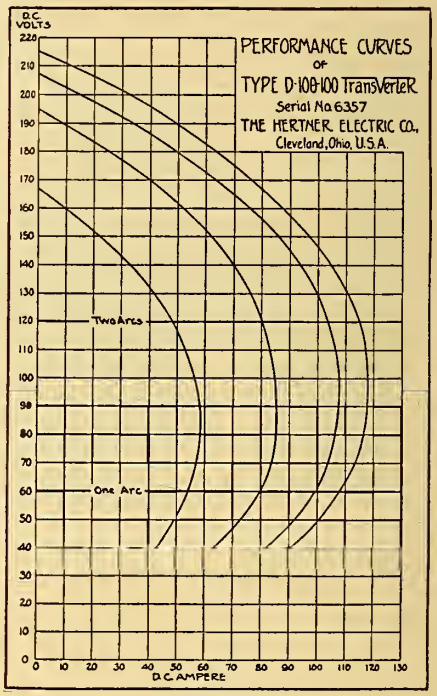


Figure 1

maintained at from 70 to 80 and a resistance ballast held the arc at about 55 volts. The considerable loss of power in the ballast, amounting as it did to from 20 to 30% of the energy generated, meant quite an expense to the theatre, especially, as in general, the power rates were higher then than they are today. This led to the introduction in 1915, by the Hertner Co., of the series-type of generator.

Series-Type Generator

Over quite a period of time—about ten years—the average theatre consumed current at the projectors of from 50 to 125 amperes and the series-type generator maintained its popularity. Requiring no ballast, it gave the owner the highest possible efficiency and insured an absence of change in current value in going from one projector to the other, which results in the least noticeable screen disturbance. Its performance is shown in Figure 1.

The past few years have seen the rapid

Two New Improvements for the booth

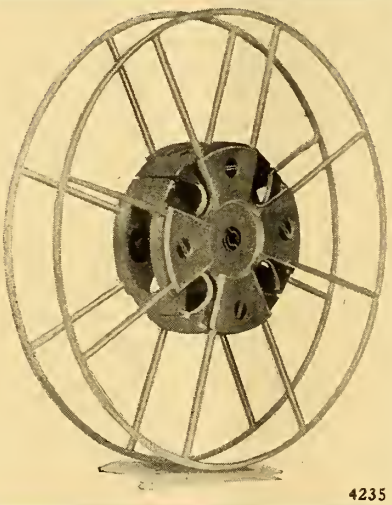
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

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THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

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introduction of the reflector arc which made possible the reduction of the current requirement to about one-third of its former value, so that the amount needed for the projection is often materially less than for the spots, flood lighting and the like, and the generator that operated projection arcs only was no longer adapted to the needs of the other apparatus. This condition brought about the re-appearance of the multiple type of generator.

The Multiple Unit

Hertner is now manufacturing a line of such units, from the smallest, which carries one 20-ampere arc continuous or two at change-over, to generators as large as may be demanded up to 100 kilowatt or 1000 amperes at 100 volts. The smaller machines are so compounded as to make their voltage the same at the two points of demand, the single and the two arcs. The large generators which may be called upon to op-

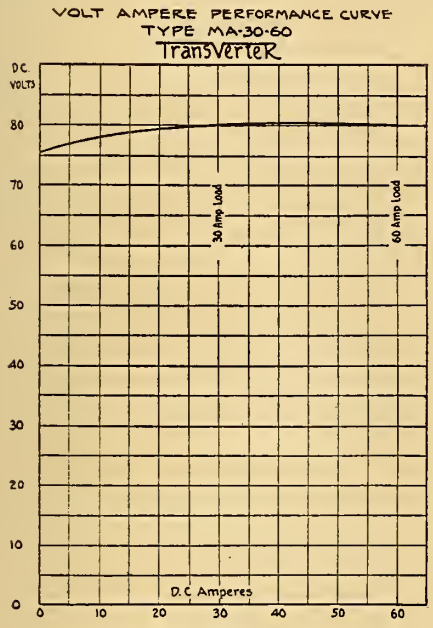


Figure 2

erate three or more arcs at one time of any amount of current from a small load up to an overload are made flat throughout. Figure "2" shows the performance of a small machine, Figure "3" is that of a large unit.

The greatest advantage of the multiple unit is that any number of appliances, taking various amounts of current, can be operated at one time, and if the performance curve is sufficiently flat, no one of them will be effected by the removal or addition of any of the others. During the changeover period the two projectors are in use and it is quite possible to burn in a spot or flood light at the same time. The convenience and flexibility thus afforded compensates for its lower efficiency as compared with the series-type.

Performance Curve of Series-Arc Type

When the field regulator is completely cut out, the current delivered at 60 volts or single-arc voltage is 108 as per Fig. 1. Opening the second arc causes the generator voltage to rise, the maximum current being delivered when the combined voltage of the two arcs is about 100. With both lamps operating normally the voltage is approximately 120 and the amperes 115.

Suppose the field regulator is set to obtain 100 amperes at 60 volts on No. 1 arc. When the second arc is opened the voltage across the generator rises and the current

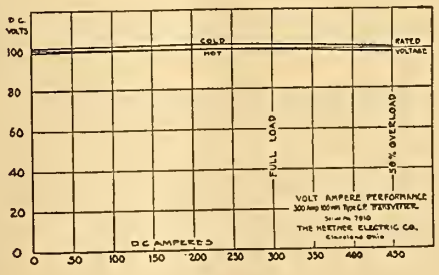


Figure 3

reaches a maximum value of 108, decreasing to 104 when the voltage reaches the working value of 120. On dropping back from a high voltage to a lower one, the retentivity of the iron causes the current to remain slightly greater than on a rising voltage. This latter is not shown on the curve since it was made on increasing values of voltage only.

This machine will deliver more than 100 amperes when warm so as to provide an excess amount of current to be used in case it is necessary to obtain more light for dark films. With additional resistance inserted in the field circuit by means of the field regulator the output of the generator can be reduced but it should be noted that at the weakest field setting shown in

(*Continued on next page*)



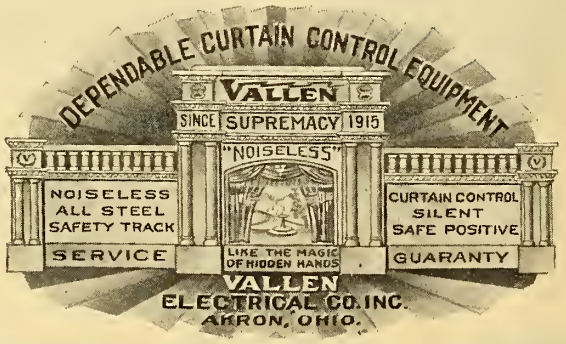
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A CITY, with a main street 180 feet long and a cross street 85 feet long, with a theatre, a school accommodating 35 pupils, a six-room house, several full-sized stores, a bank, an art gallery, a factory, and even an automobile service and gas filling station, has been built by the Westinghouse Lamp Company in its Lighting Institute on the seventh floor of the Grand Central Palace, Forty-sixth Street and Lexington Avenue, New York.

Though the most extensive exhibition of light to be seen anywhere, the chief function of the Westinghouse Lighting Institute is to act as a lighting laboratory. Here theatrical managers can come and work out novel stage lighting effects with the help of the switchboard in the theatre, which is nearly the largest and unquestionably the most versatile theatre switchboard in this city of theatres. Architects can bring scaled models of buildings they are designing, and develop floodlighting and color treatments, as though on the actual structures themselves, and they can study every variety of interior illumination in exactly the proper surroundings.

The Auditorium, 60 by 46 feet, has a rows of seats that were put there for those who will listen to the lectures or witness the movies or various demonstrations given here.

This room is illuminated by side wall lighting in four colors that presents a delightful rainbow effect, and from special overhead lighting fixtures containing seven separate circuits that are used to illustrate all types of lighting from direct to totally indirect.

Stage and Projection Room

The stage is exceptionally well equipped for many diversified lighting effects. The switchboard that controls the stage and auditorium lighting is a Westinghouse, 10-scene, pre-set type, and, considering the size of the stage its controls are larger in proportion than any theater can boast.

A projection room equipped in the most modern manner, casts pictures from the upper back part of the Auditorium onto the stage screen. Sound pictures may also be demonstrated here.

Hertner Transverter

(*Continued from preceding page*)

Figure 1, the current at single arc voltage of 60 volts is 48.

This regulation is inherent in the machine—there are no external devices necessary to give this constancy of current at the varying voltages.

Multiple-Arc Type

The volt ampere performance of the small machine shown in Figure 2 can not be made as flat as on the larger machines. The open circuit voltage it will be noted, is lower than the operating voltage. In Figure 3 the open circuit voltage is very near the operating voltage. This condition is due to the fact that it is commercially impossible to design a small machine which will have as constant a voltage with change of load as the larger types.

New Depth Process for Motion Pictures

IN a new kind of photographic picture now being produced, objects in the picture appear to stand out like real solid objects. In other words, they are stereoscopic. Small stereoscopic photographs of the kind that have to be viewed through a special device, the stereoscope, have been well known for many years. The new pictures, however, require no viewing device whatever; they are stereoscopic from practically any point of view; and they can be made in large size.

Depthographs are made by a camera which moves in an arc around the object photographed, while the exposure of the photographic plate is being made. The plate-holder of the camera contains a lined screen, which consists of a glass plate having on its rear surface an opaque black coating with parallel transparent lines in it. These lines are vertical and are very narrow.

Plate and Camera Move

During the exposure the photographic plate is moved horizontally, the total distance it moves being about equal to the distance between two lines. At any instant the camera forms a photographic image only on those parts of the photographic plate that lie immediately back of the transparent lines. This image presents the aspect of the object photographed as seen from the particular position the camera occupied at the time.

After the photographic plate has been developed a positive transparency is made from it by printing on a glass photographic plate. This picture, when viewed directly, has a blurred appearance, for the reason that it presents to view all the images produced on the plate in the various positions of the camera. But when a lined screen is placed in front of the picture and spaced slightly from it and the two are viewed by transmitted light, the lined screen permits only a single clear picture to be seen from each direction. Then as one walks past the picture he sees changing aspects of the objects in the picture just as though he were passing the real objects. Moreover, since his two eyes see the picture from slightly different angles, they see slightly different views, as in looking at a real object. This gives the picture a real appearance of depth.

Produced in Colors

It is possible to present a limited amount of motion in the Depthographs, for if the object photographed is moving, one sees from each point of view the aspect the objects presented at a particular time, and as one walks past the picture it appears to move. If one passes in the reverse direction, the motion appears reversed. Only small motions can be shown clearly.

The method of making Depthographs has not yet been applied on a practical basis to motion pictures. A somewhat modified method must be employed for this purpose, but a suitable one has been devised by the inventor of the Depthographs.

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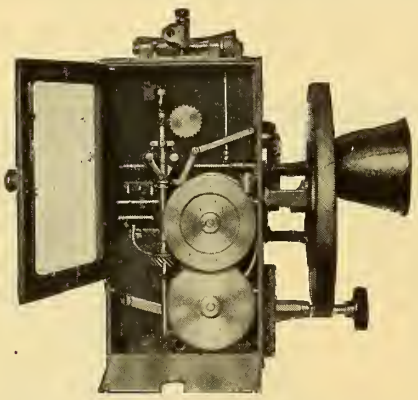
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Seek to Standardize Sound Film size

AN attack on present variations in the way motion pictures are projected will be started by the concerted action of technical experts who will set up standards to affect every theatre in the United States, it was decided at a meeting held in the assembly room of the Academy of Motion Picture Arts and Sciences, August 15.

On the basis of a survey covering all Hollywood production studios and 1,500 theatres throughout the country, appointment of a standardization committee was authorized by a joint session of the Technicians' Branch of the Academy with the American Society of Cinematographers and the Pacific Coast branches of the American Society of Motion Picture Engineers and American Projection Society.

Wide Film Rivalry

The technical organizations also voted to refer to a joint committee of the Producers' and the Technicians' branches of the Academy a resolution deploring the probability that the introduction of wide film within the next year may lead to ruinous rivalry between producing companies and urging that the wide film be made interchangeable for whatever equipment is designed. "Three companies are already in production with wide film, each using a different size," J. T. Reed, chairman of the meeting, declared. "If nothing is done to get the different people working on the development together to some extent at least the non-interchangeable and competitive machines will work as great a hardship on the theatre owners who must install them as did the revolutionary introduction of sound."

Oppose Square Picture

The survey of theatres and studios conducted by the Academy in cooperation with the technical societies revealed that the great majority of theatres are still showing sound-on-film pictures in a shape that is nearly square, it was stated in a preliminary report. However, a strong tendency backed by the weight of the Publix and Fox West Coast chains is toward the restoration of the 4 by 3 proportion so that the image will fill the usual theatre screen. The larger Publix houses are all using the reduced "Publix Aperture" and this will be extended to others as fast as possible, tabulation of the survey data showed. The Fox West Coast chain is abandoning the Movietone square at the rate of five theatres a week. Only five per cent of R.K.O. theatres are using full screen now, although Photophone equipment when first issued provided for this.

Of the 306 theatres in eight western states equipped by E.R.P.I. only a small fraction are using the reduced aperture. However, it was stated that a movable sub-base is now being worked on in the E.R.P.I. laboratories. Photographs of a sub-base being used by Publix were shown at the meeting as well as types of holders

for lenses and aperture plates that make a quick change possible.

The restoration of the full screen proportion from sound-on-film frames is accomplished by theatres which wish to do it through the use of a smaller aperture in the projection machine, a shorter focal length lens to give the picture additional enlargement and a device to center the image on the screen.

Pictures Lost Detail

The Academy survey showed that when the theatres first began to use a smaller 3 by 4 proportion aperture on pictures which were photographed with the squared frame, the tops of the heads and the feet of the characters were often sliced off on the screen. The studios have attempted to adjust themselves to the practice of some of the theatres by composing for a smaller area but data secured from eleven studios showed that each one is using a slightly different limit. This combined with wide variation in the size of aperture used by theatres has resulted in urgent need of correlation, the technical experts declared.

Studios to Cooperate

The problem of the cameraman and art director in composing to meet the theatre practices and arrange the same grouping so that it will look well on the full silent frame, the Movietone frame, and the smaller aperture area was illustrated with a special reel by Karl Struss, winner of an Academy award for cinematography last year.

R. H. McCullough, supervisor of projection for Fox West Coast theatres, F. M. Sammis, Pacific Coast representative of R.C.A. Photophone, representatives of Electrical Research Products, Inc., and technicians of the various studios took part in the discussion.

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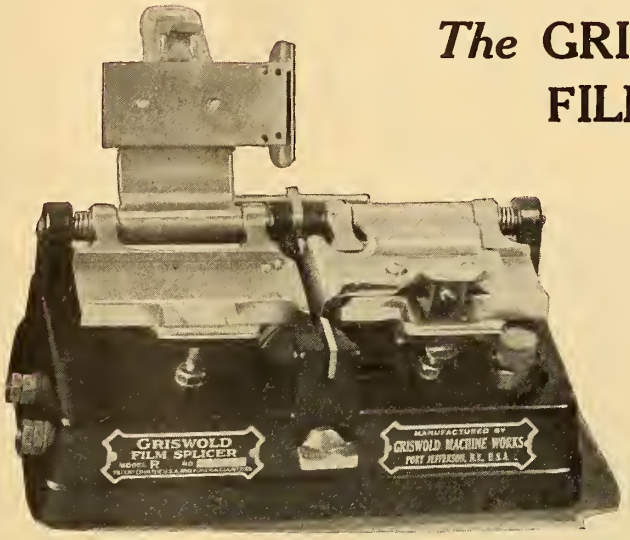
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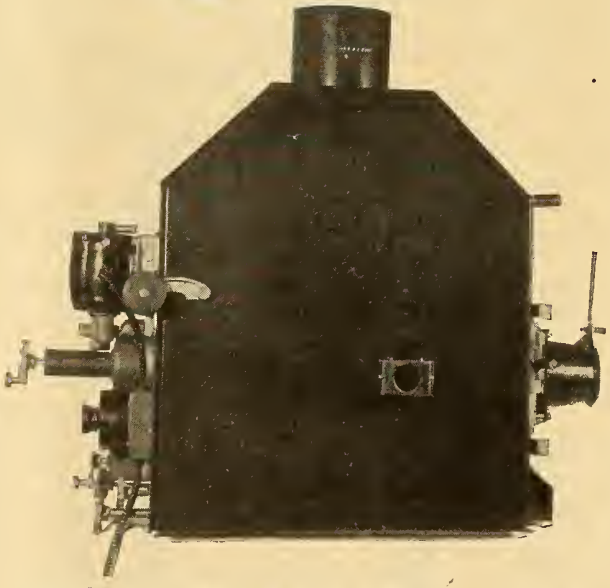
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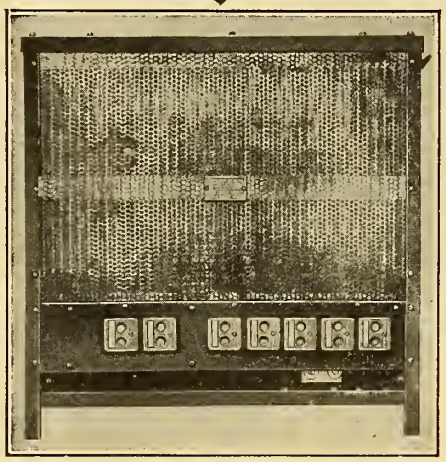
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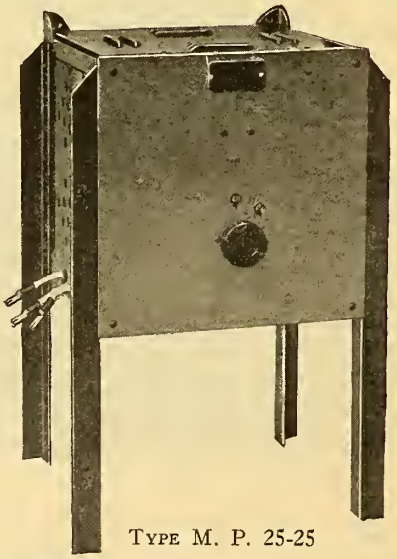
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Discs Cause of Most Sound Troubles

MANY complaints of late regarding the needle jumping the record groove emphasize the need for careful attention to the details of disc reproduction. Instructions as to proper procedure to follow should the needle jump the groove are easily obtainable from the manufacturers of sound apparatus, and every installation should have an instruction book supplied for future reference. The procedure to be followed when the needle jumps the groove are outlined below:

If the needle jumps back the sound will repeat, and may keep on repeating at every revolution of the record. If the needle jumps forward, the sound will be ahead of the picture. The procedure will depend on the character of the film and on where the jump occurs. Any record on which the needle has jumped must never be used again, and the reproducer should be checked as soon as possible. Bring fader to zero immediately jump is noticed; the next procedure will depend on circumstances, as follows:

Where Exact Synchronism Is Essential

In this case it is not possible to continue without losing synchronism, and there is therefore no option except to continue program with next reel, which is set up on other machine, or else cut out sound for remainder of this reel.

Where Exact Synchronism Is Not Essential

Keep projector running, and look over reproducer quickly to see if there is any visible cause for jump, such as reproducer body dragging on record, or reproducer hitting something that prevents it from moving freely. If so, remove obstacle or change reproducer. This, of course, involves loss of accompaniment for remainder of reel.

If no cause for trouble is evident, then, if needle jumped back, change needle, move reproducer over to a position two or three grooves ahead of where it was when it jumped, and restore fader to its regular setting. If needle jumped forward, and if it now seems to be tracking properly, restore fader to regular setting.

Synchronism is lost when record is continued after needle has jumped, so in such cases if there are any direct cues in picture, such as knocks, voices, cheers, etc., fader must be put down to zero when passing over them.

90 Weekly, W. E. Average

Latest reports credit E. R. P. I., Western Electric subsidiary, with 90 sound picture installations per week in the United States and Canada. This figure, if accurate, would enable W.E. to exceed by more than 1,000 the estimated years business of 3,000 installations. Most of the recent orders for equipment have covered both sound film and disc facilities. Extra installation shifts now being organized by E.R.P.I. will probably boost the above figure to well over 100 per week before the end of the year.

Weber Offers Synchrodisk

The Weber Machine Corp. of Rochester, N. Y., is offering a new sound picture apparatus for reproduction from discs. This equipment is known as Synchrodisk and is suitable for Motiograph, Powers, Simplex and Superior projectors. More than 200 Synchrodisk installations have been made to date in theatres throughout the United States and Canada.

Synchrondisk, which is sold on a warranty of absolute satisfaction, includes two pedestal turntables, high-grade pick-ups and a fader. The equipment is accurately machined, sturdy and is warranted to give absolute synchronism, quiet, vibrationless operation and to stand up. All gears are of bronze and hardened steel and are submerged in oil. Installation of the Synchrodisk is very simple, one hour sufficing for attachment of both turntables.

Dynamic, Brilliant Age

We mortals fume and fret. We chafe our spirit with struggle; we go through battles only to find the victory hollow and cheap. Witness the present conflict over water power in this country, inspired, we believe, because water power is associated in the popular mind with cheap power.

And now comes an inventor with sweeping claims for a simple electrical machine which will enable a whole house or office to be lighted from a tiny battery and six lamps to be burned at the cost of one. This inventor—William Harrison, an Englishman—asserts that he has discovered how to transfer low-tension battery power into high tension current on a large scale. He is prepared to revolutionize industry. He will make electrical power so cheap that all our present agencies of production will be just so many has-beens.

Of course, we are not vouching for this invention. The news comes to us through a creditable source, the United Press. The point is that we live in a dynamic and brilliant age, when the discovery and utilization of nature's hidden forces is likely at any time to make Rip Van Winkles of us all.—Electrical Workers Journal.

High-Speed Vision

Neon, one of the rare gases of the atmosphere, a by-product of the separation of oxygen and argon from air by liquefaction, first found a use in the neon signs which are rapidly coming into use. But in addition to replacing the older types of electric signs, the neon tube lamp has made possible an interesting machine for studying high speed motion.

The neon lamp is capable of being illuminated to its full brilliancy and extinguished almost completely in a time interval that is measured in millionths of a second. A rotating object, illuminated by flashes of such a duration and timed to occur exactly in step with the rotation, will appear stationary or moving at a very slow rate of speed. The phenomenon is often noticed in motion pictures when the wheels of a moving automobile appear to stop for an instant, or even to be turning backwards.

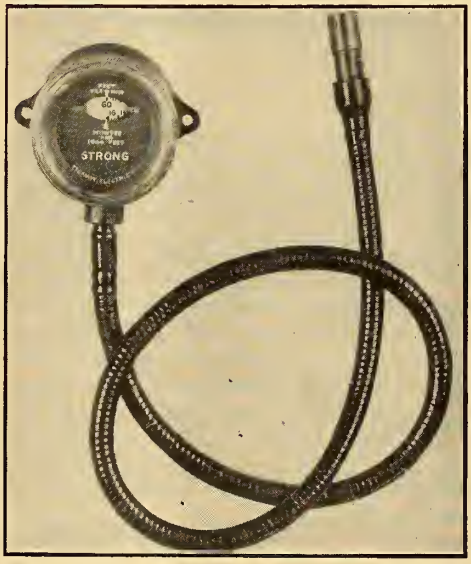
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The Movies' Lost Brilliance

From THE BIOSCOPE

London, England

IN the excitement due to the novelty of sound pictures one or two disadvantages that were brought by them into the cinema escaped notice. Now that we are beginning to examine talking pictures with a more critical eye, some of those drawbacks are demanding attention. Perhaps the most outstanding illustration is the degradation of the visual image. There has been a very serious screen loss which we have so far tolerated, but which now urgently calls for rectification, both in the quality and quantity of screen illumination. We have made, in the interests of the sound engineers, several backward steps from our previous high level. We feel very strongly that the time has come for the sound engineers to co-operate with us in restoring to the screen that high projection standard which has been impaired.

Sound Screen Troubles

The trouble has been caused by the necessity of using a screen for sound pictures which was transparent to sound. With the loudspeakers installed immediately behind the screen, the old type of solid screen caused a serious loss in the volume of sound, as well as introducing muffling effects which were objectionable. The sound impinging on the old type of screen caused a loss of directional value—and to overcome this, screens made of porous material were introduced. A great many different types of these screens have been experimented with; but, to the extent to which they transmitted sound from the loudspeaker, they failed to reflect light from the projector. The loss of light has been estimated in some cases at 50% of the pre-sound standard, and anything which impairs the quality of our pictures to this extent is extremely dangerous. It is, in fact, surprising that the matter has not provoked more protest than it has.

Not only does the use of a porous screen seriously reduce the actual area of reflecting surface available for the picture, but, by its very structure, it reduces the quality of the reflected image. The process is, therefore, a double one—a loss of light due to the absence of reflecting surface in the holes of porosities in the screen, and a degradation of screen brilliance due to the new and imperfect surface of the screen itself.

Sacrificed to Sound

In recent years we have concentrated on improvements in the arc lamp and in the optical system of the projector, with a view to constant improvement in the brilliance and definition of the screen image. All the benefits thus gained have necessarily been thrown aside in the interests of the sound engineer and the problem created is a serious one. Our public has become acustomed to a high projection standard, and anything which deliberately reduces the general level of our pictorial offering is bound to have a detrimental effect at the box office.

Let us admit that imperfect projection is not so offensive to the average patron as imperfect sound reproduction. For some unknown reason people will tolerate a poorly lit and grey picture without revolt, whereas poor sound projection becomes instantly unbearable. We may admit this as proving that for the moment preference must be given to the claims of sound, but we are emphatic that by hook or by crook the original brilliance of our screen picture must be restored as rapidly as possible.

Announcement!

IN order to conform to the general practice of publishing a monthly periodical on the 20th of the month preceding the date of issue, this issue of THE MOTION PICTURE PROJECTIONIST has been dated September, instead of August. Neither volume nor issue numbers have been affected by this change.

In future, therefore, THE MOTION PICTURE PROJECTIONIST will be published on the 20th of each month preceding the date of issue. All subscriptions have been advanced one month on our records to compensate for this advance dating.

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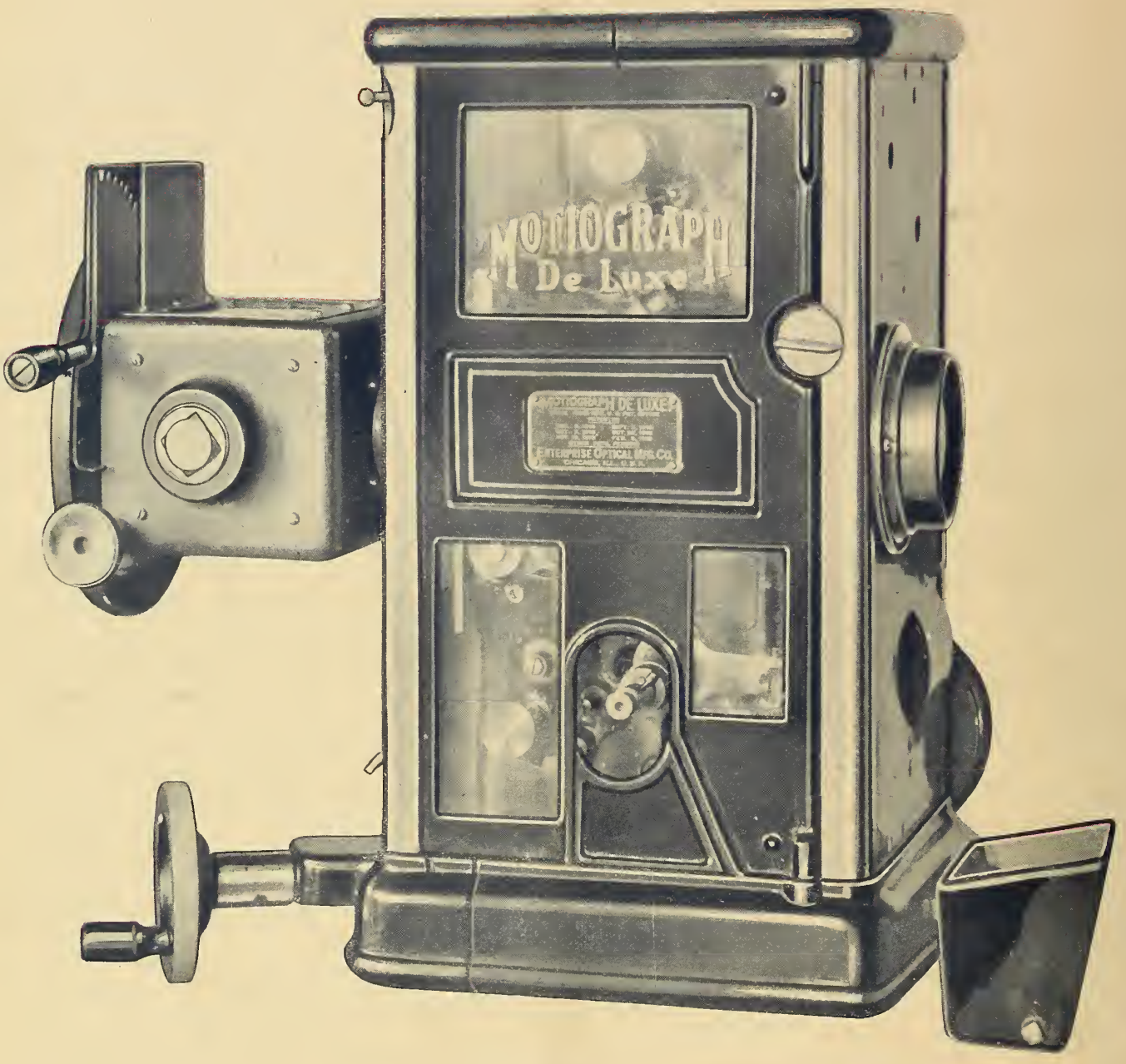
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Vol. 2, No. 12

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PROJECTIONIST

October 1929

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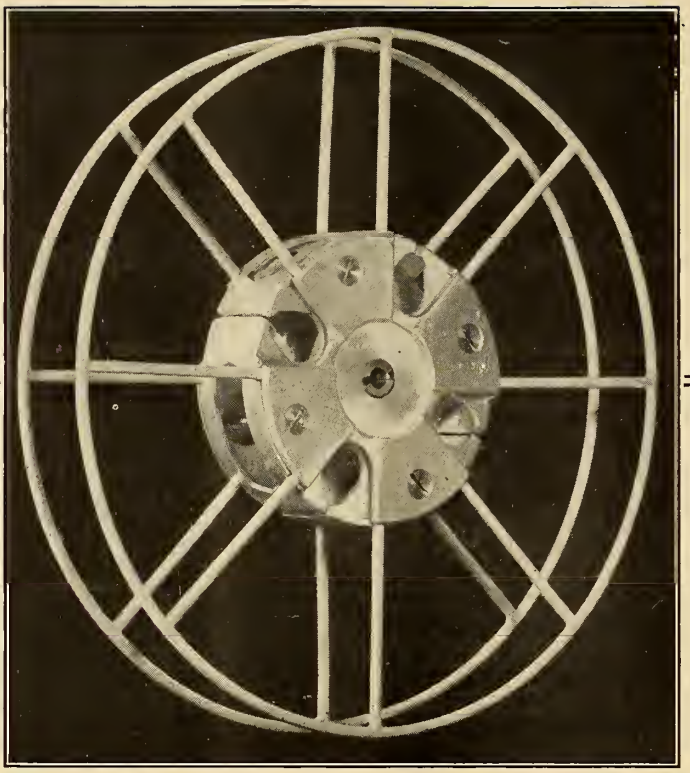
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October, 1929
Vol. 2, No. 12

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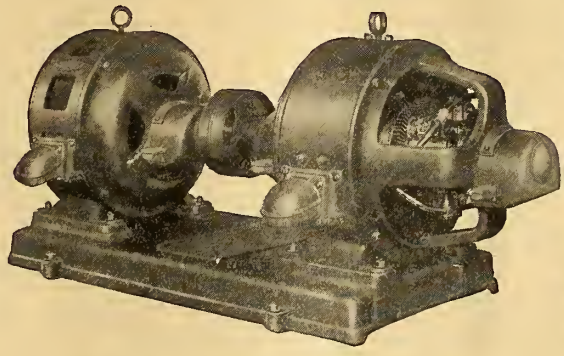
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THE Papers Committee of the S. M. P. E. has announced a tentative list of papers for the Fall Meeting which will be held October 7th to 10th, inclusive, at the Royal York Hotel in Toronto, Canada. As was to be expected, sound pictures is the subject of the majority of the papers. The rising popularity of wide film is attested to by the inclusion in the program of several papers on the subject. Recent advances in the recording art are cited in several papers by Bell Telephone Laboratory technicians. What is expected to be one of the outstanding papers is that of Professor Arthur C. Hardy of Massachusetts Institute of Technology who presents his views in a paper titled "The Optics of Motion Picture Projection." A partial list of the papers scheduled follows:

"Some Characteristics of Sound," a motion picture lecture, by Howard B. Santee, Electrical Research Products, Inc.

"Reactions of the Public to the Talking Picture," by Harold B. Franklin, Fox West Coast Theatres.

"Some Fundamental Principles of Sound Recording and Reproduction," by Wm. H. Offenhauser, RCA Photophone.

"The Principles of Sound Recording and Reproduction by the Variable Density Photographic Method," by D. MacKenzie, Electrical Research Products, Inc.

"Studio Acoustics and Microphone Placement," by J. P. Maxfield, Electrical Research Products, Inc.

"Theatre Acoustics," by S. K. Wolfe, Electrical Research Products, Inc.

"The Optics of Motion Picture Projection," by Professor Arthur C. Hardy, Massachusetts Institute of Technology.

"A New Method of Blocking Out Splices in Sound Film," by J. I. Crabtree and C. E. Ives, Eastman Kodak Company.

"Characteristics of Loud Speakers for Theatre Use," by D. G. Blattner, Bell Telephone Laboratories, Inc.

"Lubrication of Sound Film," by J. I. Crabtree, D. Hindman, C. E. Ives and O. Sandvik, Eastman Kodak Company.

"Camera Mechanisms—Ancient and Modern," by Arthur S. Newman, London, England.

"Early History of Motion Picture Cameras for Film Wider Than 35 m.m.," by Carl Louis Gregory.

"Possibilities and Problems of the Wide Film," by Lorenzo Del Riccio, Paramount-Famous-Lasky Corporation.

"Rectangle Proportions in Pictorial Composition," by L. A. Jones, Eastman Kodak Company.

"Wide Films and Standardization," by A. S. Howell & J. A. Dubray, Bell & Howell Company.

"The Wide Film from the Recording Standpoint," by C. A. Tuthill, Paramount-Famous-Lasky Corporation.

"Burn-Out Phenomenon of the Tungsten Filament," by Gorton T. Fonda, General Electric Company.

"Water Cooling of Incandescent Lamps," by Dr. Newell T. Gordon, General Electric Company.

"Radiation Characteristics of Two Mercury Arcs," by A. C. Downes, National Carbon Company.



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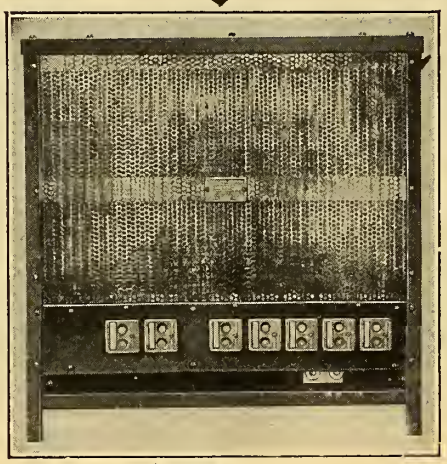
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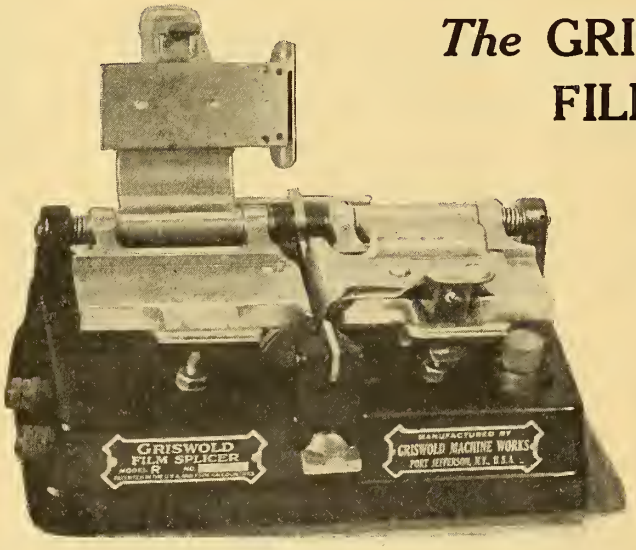
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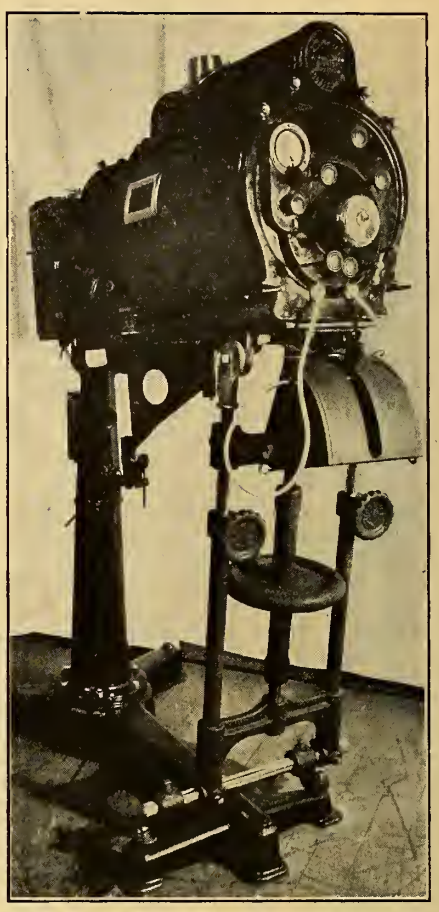
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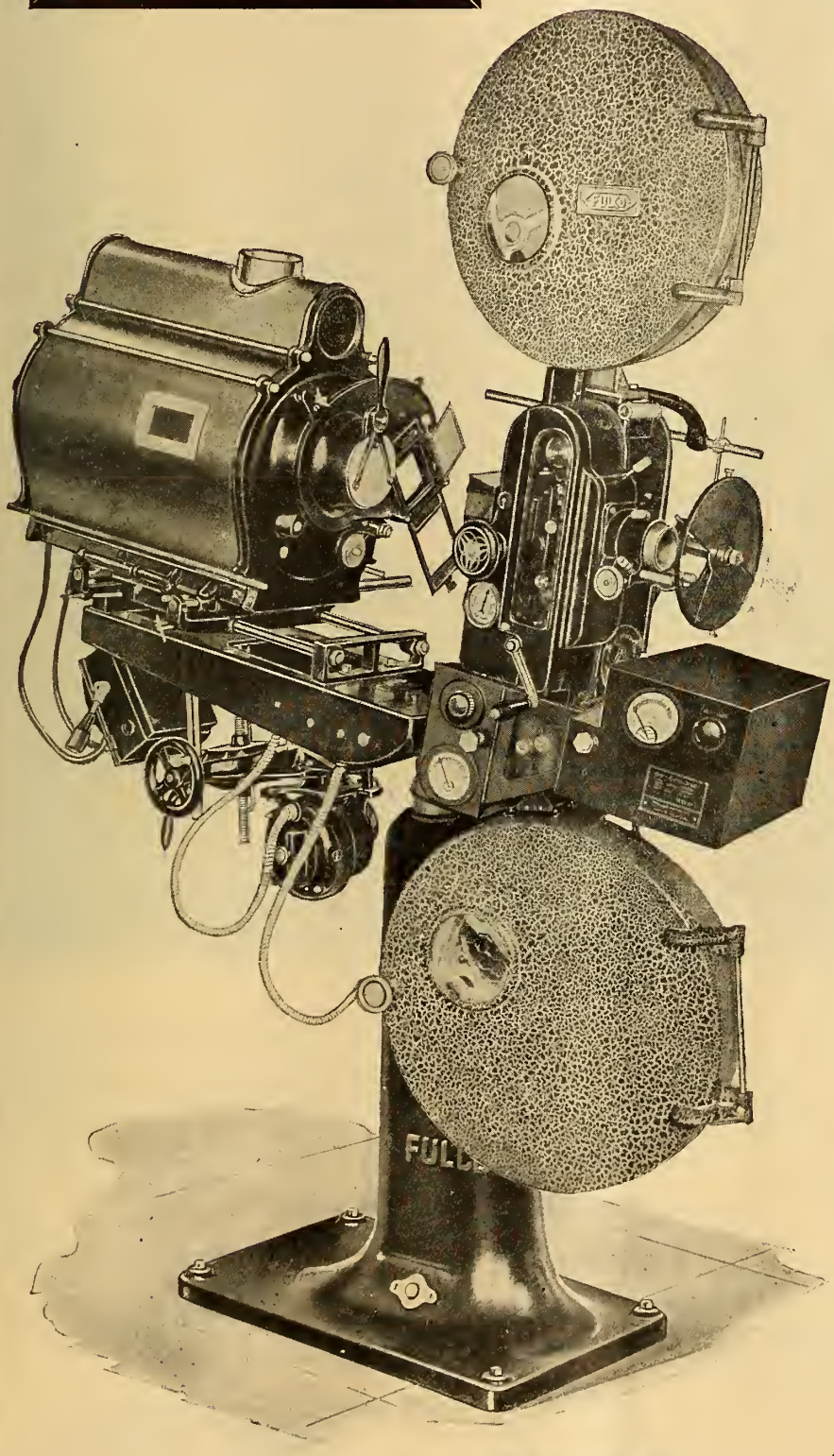
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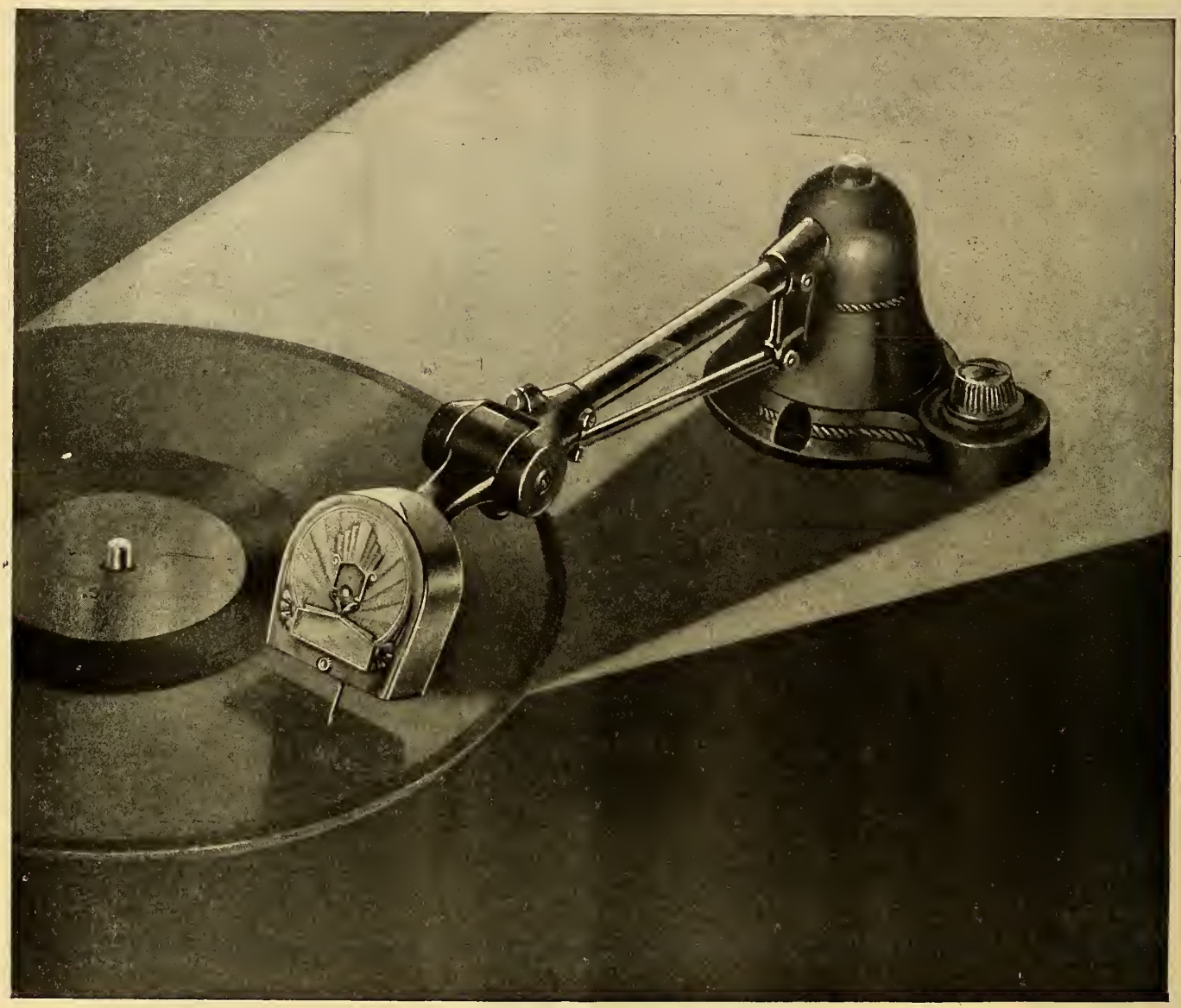
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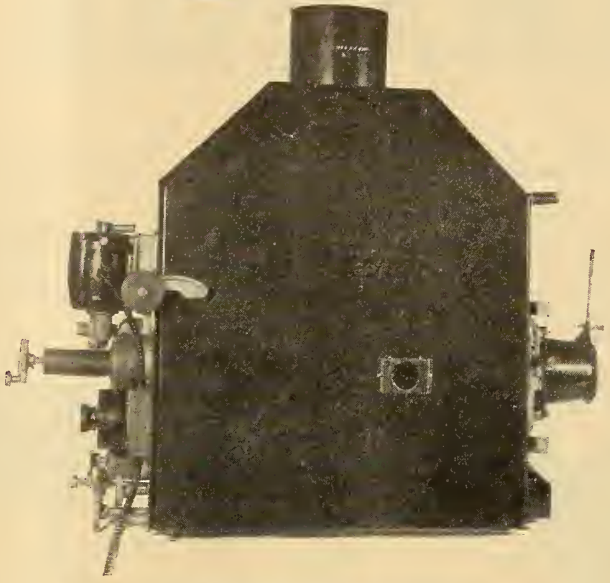
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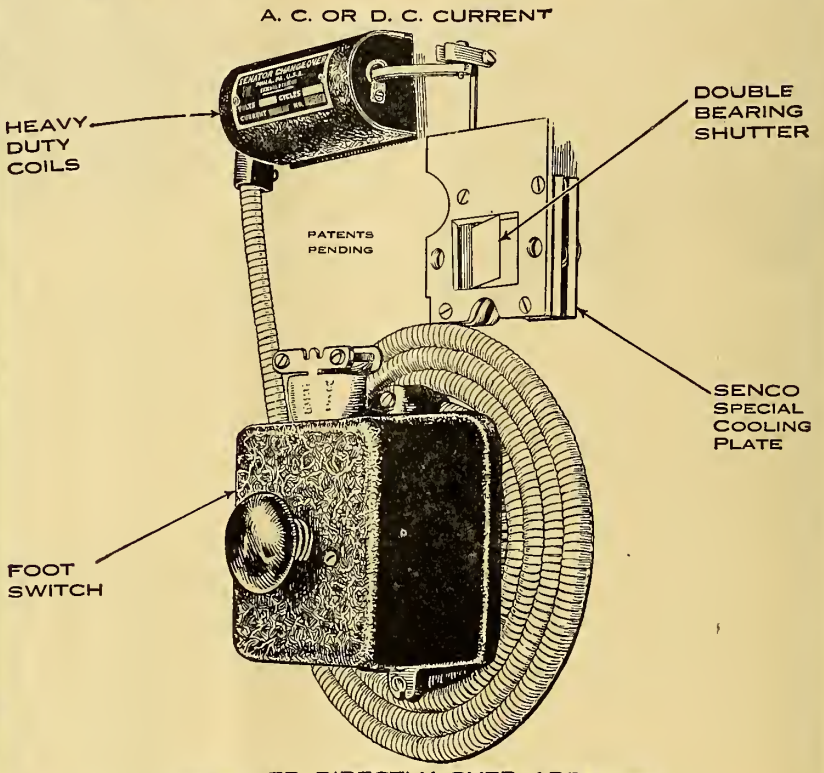
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Photoelectric Cells in Sound Projection

By A. J. McMASTER*

NOT unlike other modern engineering developments, the art of synchronized sound pictures has been made possible by the perfection of accessory apparatus first developed for use in other fields. Although the original concepts of synchronizing sound with motion pictures using both the phonograph disc attachment and the sound track on film are many years old, the present status of this new industry is due principally to the availability of the modern radio tube, loud speakers, and other electrical, optical and mechanical apparatus. Among the devices that have contributed in a large measure to the success of the sound moving picture development is the alkali metal photoelectric cell.

For many years the selenium cell was practically the only light sensitive device available for experimental work in reproducing sound from film. During the last decade, however, many important developments have been made in light sensitive tubes. The particular requirements of such a tube for use in sound picture equipment are many and varied and today have been met with a certain degree of success. For greatest sensitivity, noiseless operation, speed of response, and consistent performance, the alkali metal hydride photoelectric cell has replaced practically all other forms of light sensitive devices in sound picture work.

Photoelectric Cell Action

Whereas the selenium and similar actinoelectric cells depend for their operation upon the variation of electrical resistance of a metallic compound, the action of the photoelectric cell is quite different. In Fig. 1 a schematic illustration of the action of a modern type of cell is shown. If light is allowed to fall upon the interior sensitive surface, electrons—i. e., unit particles of negative electricity—are emitted from the surface and are attracted to the anode due to the polarizing action of the battery in the external circuit. This flow of electrons from the sensitive surface to the anode and continuing through the external circuit comprises the photoelectric current.

There are two general classes of alkali metal hydride photoelectric cells. The vacuum type, as the name implies, contains no gas. The gas-filled cell, however, is filled at a low pressure with an inert gas such as helium, argon, or neon. In this type of cell, the photoelectrons ionize the inert gas in their passage from the sensitive surface to the anode. The resulting ionization current is added to the electron current, giving a larger total photoelectric current than in the vacuum type of cell. Photoelectric cells of maximum sensitivity are therefore of the gas-filled type.

The magnitude of the photoelectric current in the gas-filled cell depends upon the specific surface sensitivity, color of light, the volume, pressure and nature of the inert gas, cell voltage and the total light

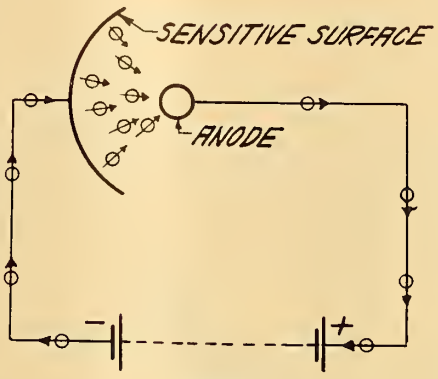


Figure 1

flux entering the cell. In the vacuum cell the current depends only upon the surface sensitivity, color and amount of light and to a certain extent upon the cell voltage. As there is no ionization in the vacuum cell, the sensitivity does not materially increase after the saturation voltage is reached, and the cell is not critical with respect to operating voltage. This characteristic is illustrated in Fig. 2. Where high sensitivity is not important the vacuum cell can therefore be conveniently used. However, the sensitivity of modern vacuum cells is but approximately one-twentieth of that of gas-filled cells and the latter are used in most sound-on-film equipment.

New Visitron Types

To meet the optical and mechanical requirements of various sound head attachments for standard projectors a number of new types of Visitron cells have been developed, some of which are shown in the accompanying figures (Figures 3 and 4). By careful design of the size and spacing of electrodes the electrical characteristics of these cells have been made very nearly the same. Because of the physical limitations of some types of sound heads, however, the over-all dimensions of these cells are quite different.

In selecting a cell most suitable for a particular projector, the optical system and cell must be so selected as to permit the greatest transfer of light energy from the exciter lamp through the sound track on the film to the sensitive surface of the cell. There are several types of exciter lamps available having different current and voltage ratings as well as over-all dimensions of filaments. The lamp, optical system and cell should be co-ordinated to obtain the sharpest and strongest light signal from the sound track. The cross-sectional area of the beam of light from the film to the cell is not important, but due to the fact that no part of the film is perfectly transparent but does have a diffusing action on the beam, the cell should be situated as close to the film as is convenient. In other words, it is of cardinal importance that the maximum light passing through the film should reach the interior sensitive surface of the cell.

In Figs. 5 and 6 the principal electrical characteristics of Visitron gas-filled cells are shown. In Fig. 6 the specific cell sensitivity in micro-amperes per lumen is plotted against cell voltage. As the voltage is raised the sensitivity of the cell increases rapidly until the curve rises almost vertically. If the voltage is raised above this critical point the cell "spills over" into a state of cumulative ionization or glowing. In this condition the cell is inoperative and is subject to serious damage.

Voltage Characteristics

The maximum safe operating voltage of the gas-filled cell depends upon the amount of light energy entering the cell. With greater light intensity the operating voltage must necessarily be lower to prevent cumu-

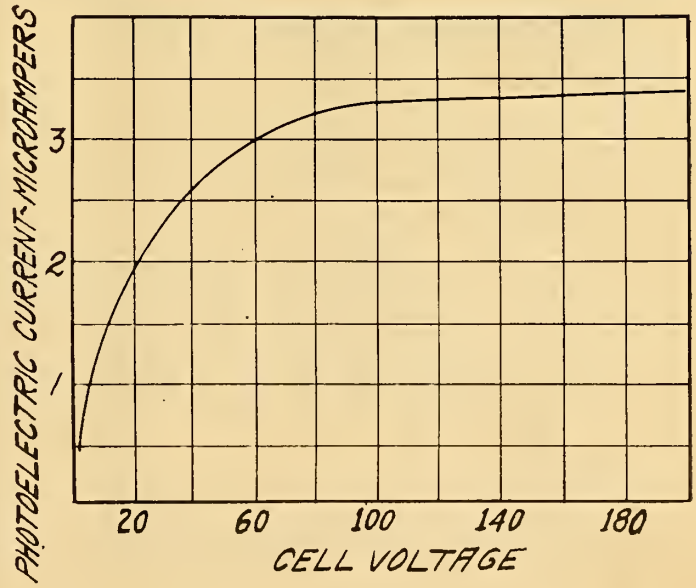


Figure 2

* G-M Laboratories, Chicago, Illinois.



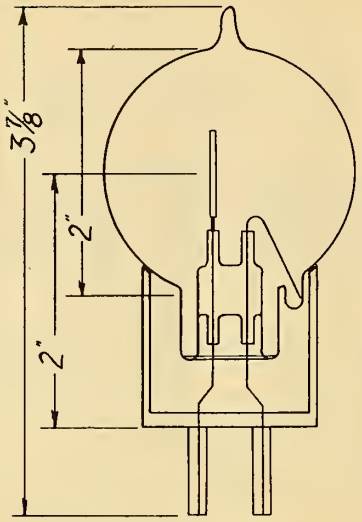


Figure 3

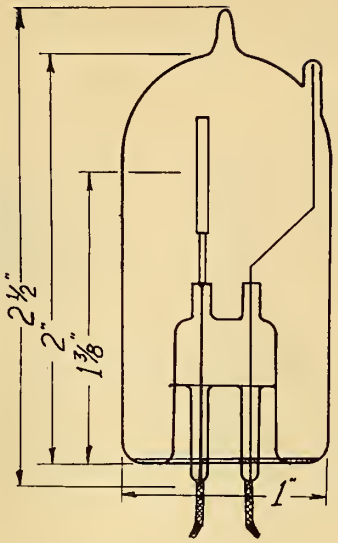




Figure 4

lative ionization. In laboratory and production tests of these cells, the dark glow voltage is usually specified, since it is not generally possible to accurately duplicate light flux specifications in the field. The dark glow voltage or voltage at which the cell glows while darkened is considerably higher than that at which the cell can ever be operated. For most sound systems the operating voltage should be twenty-five per cent, or more below the specified dark glow voltage of the cell.

As the voltage characteristic of a cell is determined by its gas-content, it is possible in the manufacturing process to adjust the operating voltage to any approximate value. In general, the higher voltage cells when operated at a definite percentage of voltage below the dark glow point are more satisfactory than low-voltage cells. Such cells are found to be somewhat more sensitive, more stable and quieter in operation. Cell noises resembling a hissing or rushing sound can generally be traced to excessive gas or to the use of too high an operating voltage. Excessive glowing of a cell tends to destroy the sensitivity of the surface and to liberate gases used in the manufacturing process. Such cells show reduced dark glow voltage necessitating lower operating voltage and are generally both weak and noisy.

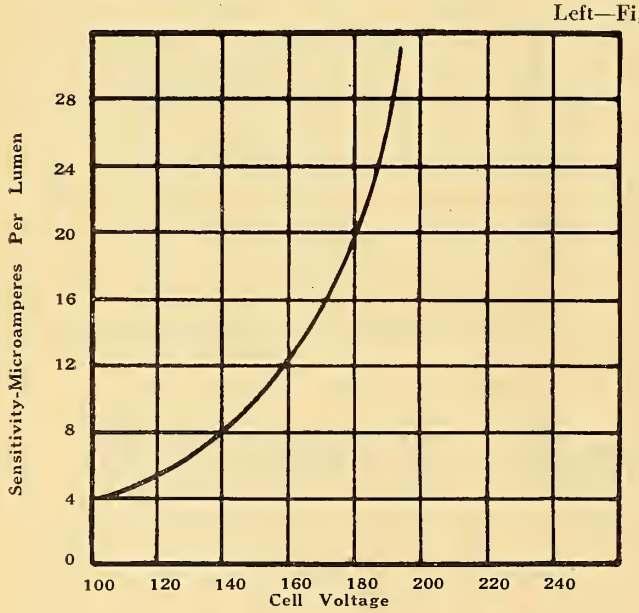
Manufacturing Process

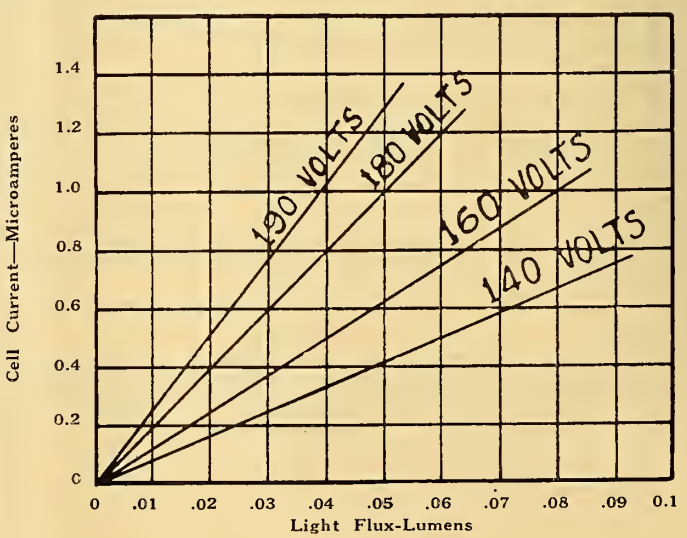
Barring such misuse, however, properly pumped and prepared gas-filled cells should give hundreds and even thousands of hours of consistent service without perceptible depreciation. In this connection it is interesting to note that during the manufacture of highest quality photoelectric cells for sound-on-film equipment, the pumping period for every cell is from fifty to seventy-five times that of present-day radio tubes. During the evacuation process the entire cell is heated to a temperature which the materials used in radio tubes are unable to withstand. The equipment used consists of the most modern and effective vacuum pumps, gauges and accessory apparatus known, and every cell is tested with the most sensitive of mirror type galvanometers for electrical leakage, voltage and sensitivity characteristics.

To obviate difficulties with ionization of gas-filled cells it is highly recommended that sufficient amplifier gain be provided to permit the use of a cell voltage well below the maximum safe operating voltage. The operating life of the cell is in this way very much extended and risk of damage to the cell and interruption of service is materially reduced. A safe operating rule is to use the lowest possible cell voltage which will provide sufficient volume without excessive amplifier noises.

In Fig. 7 are shown the linear light flux cell current characteristics for different operating voltages. Here again the increase of cell sensitivity with cell voltage is indicated. The ratio of the micro-ampere output per lumen of light flux at a definite cell voltage is a measure of cell sensitivity at that voltage. To make possible comparisons between the different cells having different voltage ratings, the specific cell sensitivity is expressed in micro-amperes per lumen either at ten per cent. below the dark glow voltage or ten per cent. below the light glow voltage (for a definite amount of light flux such as two-tenths lumen). The linear response shown between light flux and cell current in the alkali metal hydride photoelectric cell is of course an important factor in the undistorted reproduction of sound from film.

Left—Fig. 5; Right—Fig. 6







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How and Why the Fader

By HORATIO W. LAMSON*

WE assume that all of our readers are familiar with the effective motion picture technique, the fade-out, whereby the close of a scene is dissolved by restricting the field of view towards the center of the picture frame, and, at the same time, reducing the intensity of illumination. This is usually accomplished in the studio by slowly closing one or two iris shutters while the camera is in operation, or the fade-out may be produced in the projection room by the manipulation of an iris shutter on the projector. With the advent of synchronous and non-synchronous sound accompaniment for motion pictures, the need arose for an analogous acoustical fading-out device, the fader.

The purpose of this instrument is twofold. The acoustical condition of a theater, due to its dimensions, architectural features, and especially the size of the audience, varies considerably from time to time, so that the fader serves first of all as a convenient means for controlling the volume level of the reproduced sound in order to achieve the most natural and pleasing results. The proper monitoring of a sound presentation to meet the existing conditions contributes greatly to the success of the program.

The fader also provides for reducing the output of an expiring film or disc sound track to zero and subsequently building up the level of the new sound track to the proper value. An abrupt change between the sound tracks at full volume levels gives rise to undesirable transients in the electrical systems. By the use of the fader the change from one to the other can be made in such small steps that it is not perceived by the audience, and transients are minimized even though the transfer is made as quickly as possible. To accomplish these purposes the fader is built in the form of a two-sided or bilateral attenuator. We propose to discuss the relative merits of various types of faders.

Simple Fader Design

The simplest scheme is shown in Fig. 2. P_1 and P_2 represent two pick-ups (for film or disc tracks), and s is a movable contact which slides along the resistances R and connects to the grid of the amplifier tube. Here, because the tube draws no energy, the fader operates as a simple voltage divider having a total resistance of 2 R. The load R in which each pick-up is terminated should have a value approximating the impedance of the pick-up, if it is desired to match impedances.

The adjustable resistance in all of these faders may be constructed in one of two forms: (1) as a continuously-adjustable slide-wire, or (2) as a step-by-step attenuator in which a contact-stud type of switch adjusts the attenuation in pre-determined discreet increments to give any

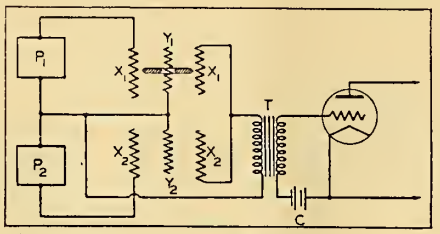


Figure 2

desired calibration scale, which, however, is usually made uniform in decibels (tu's). The slide-wire type may likewise have a scale calibrated uniformly in decibels, if the form upon which the wire is wound is cut in the proper shape.

Use of a Transformer

It is often desirable to interpose a transformer between the pick-up and the amplifier. In this case the fader arrangement shown in Fig. 3 might be used. Here the values of R should be quite large so that the currents drawn from the secondary coils of the transformers T_1 and T_2 will not be of sufficient magnitude to injure their frequency-response characteristics.

The faders function in both Figs. 2 and 3 purely as voltage dividers. When these methods are used, it is highly desirable that the fader be made an integral part of the amplifier so that the lead connecting s to the grid of the tube may be shielded and kept as short as possible. Such a procedure is feasible in non-synchronized equipment, but it is not so desirable with synchronized apparatus where it is more convenient to have the fader in the form of a separate unit at a distance from the amplifier and adjacent to the projectionist standing beside the projector. This service requirement may be met by making the fader operate not as a voltage divider but as a current attenuator.

The method of Fig. 4 suggests itself. This is an L-type network in which both the series and shunt arms are adjustable in such a manner that their sum remains constant and equal to R. Such an arrangement is, however, undesirable for two reasons. First, the matching of the pick-up and load impedances in both directions is poor, and second, the output circuit being largely inductive, the attenuation for a given setting of the fader is a function of the frequency. The resulting suppression of the higher harmonics causes distortion.

These difficulties may, of course, be largely overcome by employing a fader which consists of an adjustable H- or T-type network after the manner shown (for a T-type), in Fig. 5 which requires three sliding contacts. To increase the attenuation the two resistances X_1 and X_2 are increased, and, simultaneously, the resistance Y is decreased. This ideal network requires a complicated and expensive switching mechanism which represents, for sound pictures, a greater refinement than is warranted in practice.

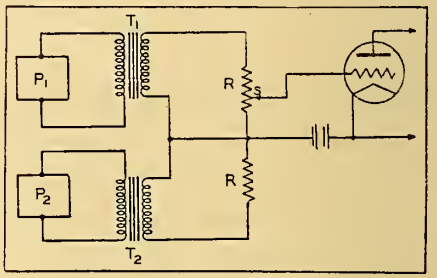


Figure 3

Efficiency with Economy

The first step toward obtaining an economical design without noticeably sacrificing quality is shown in the compensated fader of Fig. 6 in which a compensating resistance C is adjusted in syn-

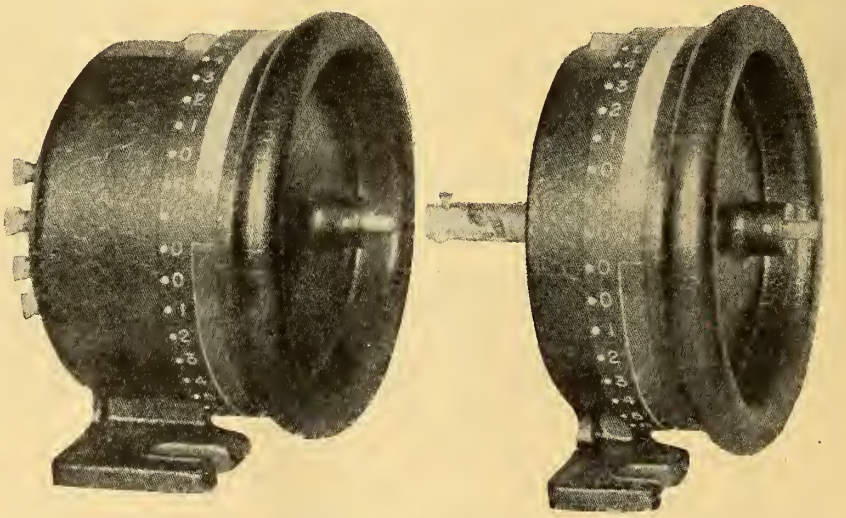


Figure 1. The General Radio Type 598 Fader. At the left is the fader proper; at the right is the "dummy" or auxiliary control. In practice the two are mechanically coupled

*General Radio Company.

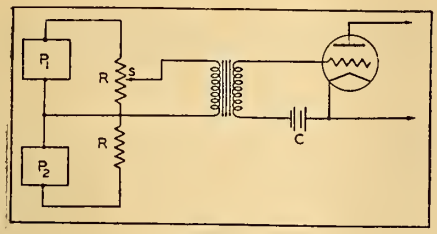


Figure 4

chronism with R. This gives us an adjustable T-type network in which the total resistance of one series arm plus the shunt arm r remains constant.

If the adjustable series or compensating arm C be located, as shown, on the side toward the pickup, it is possible by proper design to maintain the impedance into which the pickup works at a constant value. This is the most important matching requirement. The impedance looking back from the load will vary between R and some minimum value, but this is relatively unimportant. To increase the attenuation the sliding contacts are moved so as to reduce r and increase C. The calibration of such a fader presents too lengthy a problem for analysis here.

It has been found in practice that the fader shown in Fig. 6 may be further simplified and still give correct impedance relations to prevent introducing noticeable distortion. This is accomplished by giving C a fixed value of the proper amount. We now have a T-type network in which one series arm C is held constant, while the other series arm and the shunt arm are varied in such a manner that their sum remains constant and equal to R. This network gives the correct impedance looking out from the pickup at only one setting which in practice is chosen at approximately two-thirds of the full volume level.

The schematic diagram for a fader arranged for economy of resistance units and having fixed compensation and a step-by-step adjustment of attenuation is shown in Fig. 7.

Faders for synchronized equipment frequently carry a selector switch (not shown in Fig. 7), for shifting the pickup terminals from the film to the disc sound track. Such faders are usually provided with fifteen steps on each side which are calibrated to give about three decibels attenuation each. They may, of course, be designed to have any desired impedance and attenuation, but, in order to minimize inductive interference in these circuits which are connected to the input of a powerful amplifier the impedance should be kept as low as possible. Thus, the very high impedance photo-electric cell is connected to an amplifier located adjacent to the cell. The signal from this amplifier, which has a low internal output impedance, is subsequently fed into the fader at approximately the same energy level obtained directly from the disc pickup.

In order to minimize impedance variations or to match unlike input and output circuit impedances, it is occasionally the practice to install fixed networks or pads before and after the fader. Such pads necessarily introduce a certain amount of attenuation which must be compensated for by an increase in the over-all gain of the amplifying system.

For convenience of the projectionists the fader is usually installed near one projector; and a dummy control unit, carrying a duplicate scale, is mounted beside the other, the dummy and the fader being joined by appropriate shafting. In certain installations auxiliary change-over switching mechanisms are placed in the dummy control unit.

Ruggedness and Reliability

In designing the various mechanical features of the fader, it should be borne in mind that motion picture theaters are scattered far and wide over the land and that a large majority of them do not have

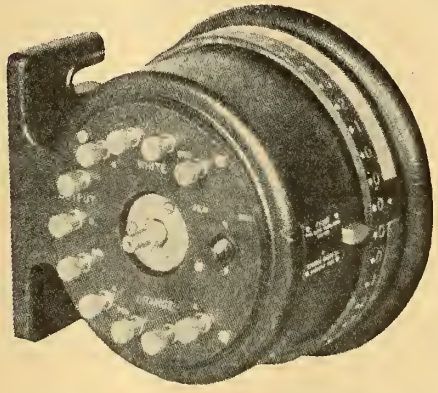


Figure 8. View of Type 598 Fader showing connection panel and selector switch for changing from film to disc track

immediate access to a trained technician. Unlike a vacuum tube or a photo-electric cell, a defective fader cannot be replaced or repaired in a moment's time. A failure of this device would seriously interrupt a program schedule.

It is, therefore, of paramount importance that, in conjunction with the amplifiers and associated equipment, the fader be rugged in construction and as free from service troubles as good design, workmanship, and materials can insure. The containing cabinet and switching mechanism should be ruggedly built and rigidly mounted so that they will withstand an indefinite amount of ordinary handling.

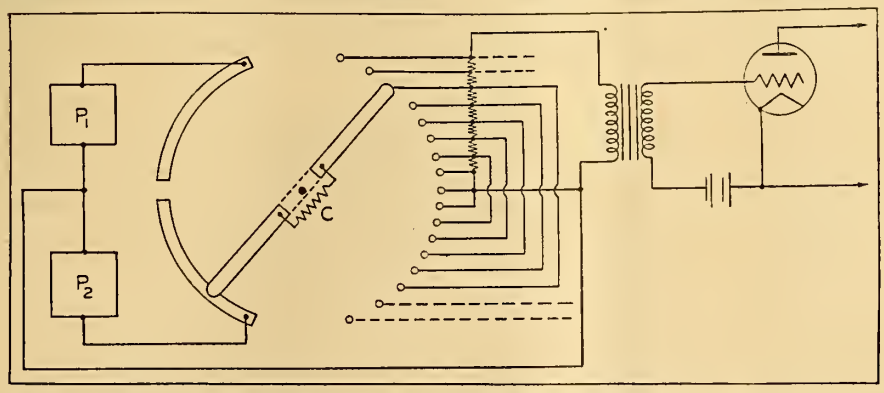


Figure 7. Schematic diagram for a fader like that shown in Figures 1 and 8. The connections for the selector switch are not shown

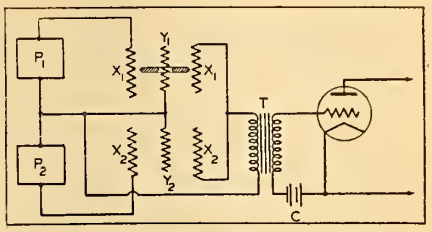


Figure 5

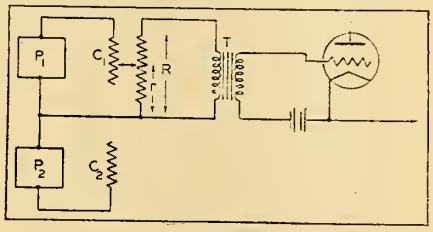


Figure 6

If a dummy control be used, there must be no appreciable blacklash between the dials of the dummy and master units. Early types of faders made use of a rack and pinion drive between the units. This was soon found to be unsatisfactory and was superseded by bevel gears and shafting equipped with universal joints to relieve inaccuracies in the mounting alignment. The most recent design, introduced by the General Radio Company and illustrated in Figures 1 and 8, eliminates the need for bevel gears and requires only straight shafting and universal joints between the dials of the master fader and the dummy control.

It has been found that a properly designed step-by-step contact switch is quieter and more reliable in its electrical operation than the ordinary form of continuously-variable slide wire.

Care must be taken, however, in the proper choice of materials for the contact studs and brushes in order to obtain a combination which shall be free from oxidation which might introduce erratic contact resistances. Minute current variations produced thereby, after enormous amplification, would introduce, especially at high volume levels, a disagreeable scratching noise in the loudspeakers whenever the fader was manipulated or subjected to jarring.

Cleaning Gears and Sprockets

It is important that the gears and sprockets be kept clean at all times. These parts should not be cleaned with cloth, because cloth adds to the accumulation of dirt and also deposits its own lint. An ordinary toothbrush or typewriter brush will do very nicely for this job. The long bristles in the brush will get into many places otherwise impossible to reach.

Carbon: Its Properties and Uses in Motion Picture Projection

By ENGINEERING DEPT., NATIONAL CARBON CO.

II.

CARBON trims may be divided into two general classes, (1) those for direct current, (2) those for alternating current. Direct current trims may be subdivided into (a) old type low intensity, (b) mirror or reflecting arc low intensity, (c) high intensity. Alternating current lamps are known only as low intensity lamps.

There is a very valid reason in the preference for direct current for the operation of motion picture machines, because for equal amperages, direct current gives possibly twice as much light as alternating current. This is due mainly to the intermittent reversal of the direction of current flow peculiar to alternating current, resulting in the electrical energy being expended in the development of heat at the tips of both electrodes instead of the same energy being concentrated on the positive electrode only, as is the case with direct current projection. Then, too, with alternating current it is more difficult to obtain the same efficiency in crater adjustment.

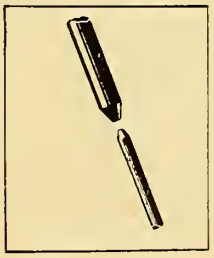


Figure 10

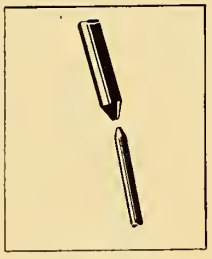


Figure 11

D. C. Old Type Low Intensity Lamps

The old type, direct current, low intensity lamps, being the first on the market, will be discussed first. The positive carbon in one type is set at an angle of 20° from the vertical and the negative carbon at an angle of 20° from the vertical.

In another type the positive is set at an angle of 15° from the vertical and the negative at an angle of 10° from the vertical. (Figs. 10 and 11.)

You have undoubtedly observed that the positive carbon used in these lamps is always cored; that is, the center of the carbon has been filled with a softer mix of carbon known as a core. Somewhat more light could be obtained from a solid carbon used as a positive, but it would be impossible to control the arc, so, for the sake of arc steadiness, a core is put into carbon. The advantages derived from the core more than offset the slight loss of light.

It might be explained here that the light from a low intensity direct current arc comes from the crater in the positive carbon. The object, then, is to hold the crater



Figure 12

in a constant position. Formerly the common practice was to use a large diameter regular cored or solid projector carbon in the lower or negative holder. In some cases this negative carbon was slightly smaller in diameter than the positive carbon, whereas in others the same diameter was used.

As a result the negative carbon was so large in diameter that it was impossible to concentrate the arc on one spot, which meant that there was considerable wandering or "traveling," as it is sometimes called. This resulted in a poor light on the screen. To overcome this condition some projectionists shortened the arc length to such an extent that a certain amount of the light from the crater of the positive carbon was intercepted by the negative carbon, thus decreasing the illumination. Obviously, another way of correcting this condition was necessary.

The Orotip Carbon

With this in mind, National Carbon Co. several years ago introduced the Silvertip negative carbons. The principle of this product consisted of the application of a metal coating to the negative carbon. With this development the current-carrying efficiency was so increased as to make it possible for a 5/16" diameter carbon to carry the same amount of current as had previously required the use of a 9/16" plain negative carbon. This product was the first metal coated negative carbon on the market.

National Carbon Co. has now developed a carbon which is generally regarded as an even better carbon than the Silvertip. This new product is a copper-coated carbon and is known as the Orotip. It is a new product all the way through—new shell, new core, and new coating. The composition of the shell is such that it is of remarkably long life. The structure of the core is such that even under the most severe operating conditions it will not recess, or burn back, but instead burns quietly and steadily. Such a small amount of metal has been applied to the carbon that condenser pitting has been reduced to a minimum.

The following combination of carbons have been found, after very careful tests

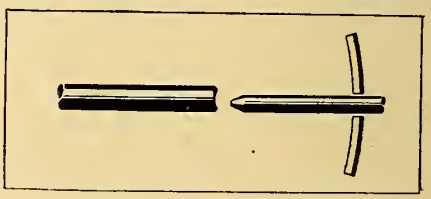


Figure 13

both in the National Carbon Co. laboratory and in various theatres, to give the best results: (Table 1).

Reference has already been made to alternating current for motion picture projection. When it is not possible to obtain direct current straight from the line—and this is usually only possible in the downtown sections of large cities—converting devices of one type or another are used. In some cases, however, theatres prefer to operate on alternating current.

Engineers have long been at work to develop an alternating current trim which

Table 1

NATIONAL CORED AND OROTIP PROJECTOR COMBINATIONS FOR DIRECT CURRENT

Arc Amperage		*Size Inches*	*Kind*
25- 50	Positive	5/8 x 12	National Cored Projector
	Negative	5/16 x 6	National Orotip Solid or Cored Projector
50- 65	Positive	3/4 x 12	National Cored Projector
	Negative	11/32 x 6	National Orotip Solid or Cored Projector
65- 70	Positive	7/8 x 12	National Cored Projector
	Negative	11/32 x 6	National Orotip Solid or Cored Projector
70- 85	Positive	7/8 x 12	National Cored Projector
	Negative	3/8 x 6	National Orotip Solid or Cored Projector
85-120	Positive	1 x 12	National Cored Projector
	Negative	7/16 x 6	National Orotip Cored Projector
120-140	Positive	1 3/8 x 12	National Cored Projector
	Negative	1/2 x 6	National Orotip Cored Projector

would burn quietly and steadily and emit a white light comparable to that given by a D. C. arc. Formerly, all A. C. arcs—particularly when operated at around 65 amperes—made a very loud roaring noise, which increased at higher amperages. To meet this need for an efficient A. C. carbon the National White Flame A. C. was developed.

With this product the objectionable noise has been practically eliminated. The arc is more steady and the light on the screen is snow white, showing better perspective, better penetration and more detail. These special carbons which are put up in sets consisting of one 12″ upper and two 6″ lowers, are made in four diameters, suitable for currents ranging from 25 to 100 amperes. The diameter of both upper and lower carbons is the same (Table 2).

Twelve-inch uppers and six-inch lowers are considered as standard lengths for all A. C. lamps. Both upper and lower carbons are cored. It has been the general experience of users that with this type of lamp the best results are obtained if the upper carbon is set at an angle of 20° from the vertical and the lower in a vertical position (Fig. 12). In some lamps, however, the position of both upper and lower jaws is fixed, thus preventing any adjustment.

D. C. Mirror or Reflector Arc Type of Low Intensity

A new type of low intensity lamp known as the mirror or reflecting arc, operating at low currents (from 10 to 35 amps.), is rapidly replacing the old type of low intensity lamp on the market. Two general types are being produced, one with both positive and negative carbons set in a horizontal position (Fig. 13), and the other with the positive carbon set in a horizontal position and the negative carbon at an angle of 75° with the horizontal (Fig. 14).

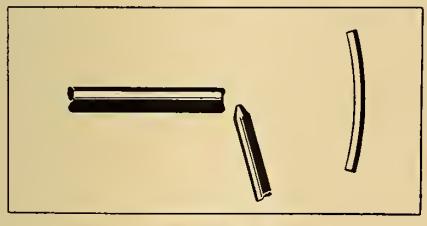
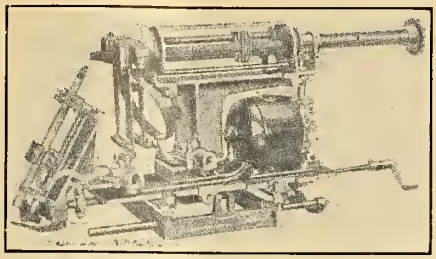


Figure 14

The first-mentioned type is the one principally used in this country at the present time. The second type is quite popular in foreign countries.



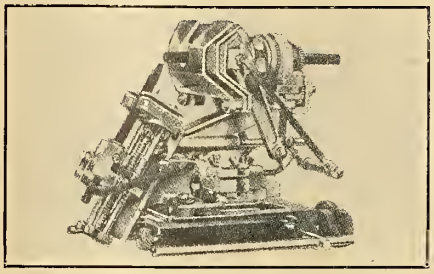


Figure 16

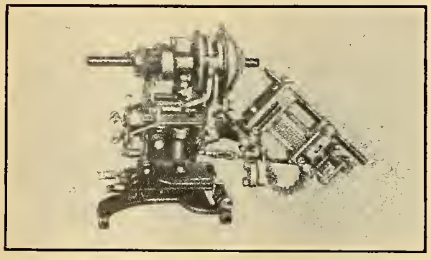


Figure 17

The positive carbons in both types face a mirror against which the light is thrown. This mirror reflects the light to the aperture plate. In at least two makes of lamps the light first passes through a large condenser on its way to the aperture plate. The positive carbon is slightly larger in diameter than the negative, and should burn with a cup-shaped crater as shown in Fig. 15.

In the horizontal trim lamp this cup-shaped crater is obtained by setting the negative carbon slightly lower than the positive. In the angular type of lamp it is obtained by adjusting the height of the negative tip so as to obtain as near a vertical crater as possible without obstructing the light from the crater itself. The eight combinations of carbons shown (Table 3), have been worked out very carefully, and if followed will insure excellent results.

High Intensity Lamps

There are two general types of high intensity lamps on the market. The two lamps shown in Fig. 16 are of one general type in which all of the current flows through the negative carbon at the holder end, and the negative carbon feeds through a baffle plate. In one lamp the baffle plate completely surrounds the carbon, whereas in the other it only partially surrounds it.

In the other type (Fig. 17), part of the current flows through the negative carbon at the holder end and the rest of the current at the V rest. This arrangement permits the use of a smaller negative carbon.

In both types the positive carbon is set in a horizontal position and rotates slowly. The gain in efficiency with this light comes from the high crater brightness resulting from the luminescent vapors in the positive cup and the right angle position of the positive carbon. The crater faces the condenser squarely and is placed at the best optical position. From the cup of the positive carbon a very bright gas stream issues which is met by a relatively dim stream flowing from the negative electrode. This cup contains luminescent vapors that are brighter than the floor of the cup; and the light, which is a bluish white of a very high candle power, is largely produced by electro-luminescence. Naturally, the greater the electrical energy in-put, the more light obtained, but beyond a certain current value for each size of carbon, the added light is very small and the carbon consumption becomes very rapid.



Figure 15

(To be continued)

Table 2

NATIONAL WHITE FLAME A. C. PROJECTOR COMBINATIONS FOR ALTERNATING CURRENT

Arc Amperage	*Arc Voltage*	*Diameter Inches*	*Kind*
25-40	25-28	½	Combination
40-60	28-32	⅝	Combination
60-75	32-35	¾	Combination
75-100	35-40	⅞	Combination

Table 3

HORIZONTAL TRIM LAMPS

Arc Amperage		*Size*	*Kind*
10-15	Positive	9m/m x 8″	National Cored Projector
incl.	Negative	6.4m/m x 8″	National Solid Projector
16-20	Positive	10m/m x 8″	National Cored Projector
incl.	Negative	7m/m x 8″	National Solid Projector
21-25	Positive	12m/m x 8″	National Cored Projector
incl.	Negative	8m/m x 8″ or 8m/m x 8″	National Solid Projector National Cored Projector
26-30	Positive	13m/m x 8″	National Cored Projector
incl.	Negative	9m/m x 8″	National Cored Projector
31-35	Positive	14m/m x 8″	National Cored Projector
incl.	Negative	10m/m x 8″	National Cored Projector

ANGULAR TRIM LAMPS

Arc Amperage		*Size*	*Kind*
6-10	Positive	9m/m x 8″	National Cored Projector
incl.	Negative	8m/m x 8″	National Cored Projector
11-15	Positive	10m/m x 8″	National Cored Projector
incl.	Negative	9m/m x 8″	National Cored Projector
16-20	Positive	12m/m x 8″	National Cored Projector
incl.	Negative	10m/m x 8″	National Cored Projector

NATIONAL CORED AND SOLID PROJECTOR COMBINATIONS FOR MIRROR OR REFLECTOR ARC LAMPS

As The EDITOR Sees IT

¶ *And Now Grandeur*

THE air is filled these days with talk of wide film, the usurper of the prominent place heretofore held by sound pictures. Sound pictures still are interesting, of course, but in any present consideration of things projection they are regarded as just a detail of wide film. Unlike so many other things in the motion picture industry, the introduction of wide film was marked by a minimum of talk and a maximum of work. Before it had been talked about much, it was an established fact and was ready for showing on Broadway, with every detail worked out so that there might be no necessity for alibis for this or that defect.

Grandeur, the Fox Film Company's contribution to the art, is the latest entry in the wide film derby, which already includes Magnafilm, of Paramount, and RCA's Spoor-Berggren process. Other plans for wide film are afoot, but they have not yet reached the stage where they merit comment. Of the three systems mentioned above, no one process has what might be termed an outstanding feature. The only differentiating fact seems to lie in the direction of film size, with Grandeur being 70 mm., Magnafilm 56 mm., and RCA 62 mm. Whether these proportions will be maintained when it comes to general distribution to theatres is not known, but it would seem the logical thing to expect in view of the worry and expense incident to the introduction of sound pictures with its attendant furor about interchangeability. Even now the demands of the technical branches of the industry for standardization go unheeded.

We again wish to point out that no wide film process yet introduced embodies stereoscopic relief. The conventional thing these days is to proclaim that a certain process embodies an "illusion of depth." This means nothing. Stereoscopic relief still is in the future.

Elsewhere in this issue there appears what little details are available about the Grandeur system. It appears that the process offers no new problems to the projectionist, except, possibly, insofar as it may demand increased care and watchfulness in running the show. It can be said for Grandeur that it is a splendid mechanical achievement and marks a milestone in the progress of motion picture engineering.

¶ *The Status of Television*

ADMITTED by even its most ardent proponents as being in the laboratory stage, television is at present the beneficiary of a huge ballyhoo. As Samuel Wein points out, the art of television still has a long way to go before it can be considered seriously as a commercial possibility, yet in its present status this latest scientific endeavor is daily being touted as the successor within the next two years to motion pictures as the most general form of entertainment. No less an authority on show business than Harold B. Franklin, president of Fox West Coast Theatres, sees television as the entertainment of a few years hence, although it is significant that Mr. Franklin does not commit himself to any definite period of time.

Whatever may be the general idea of the public anent television, it is safe to say that nothing in the way of present-day demonstrations would indicate that the development of the science may be expected shortly. One year ago we saw television demonstrated at the Bell Telephone Laboratories; again this week we saw another demonstration. Progress there has been within the space of one year, but not enough to justify the extravagant claims of those who see television as a commercial possibility within the next few months.

¶ *Why Storage Batteries*

RECENT developments in the reproduction end of sound pictures would seem to indicate that the use of storage batteries with sound equipments has outlived its usefulness. This assertion is based on the fact that we witnessed two demonstrations recently which proved to our satisfaction at least that much simpler and less expensive methods may be employed to supply both exciting lamp and horn units with current without the aid of storage batteries. In fact it is reliably reported that the sponsors of certain sound equipments themselves have developed ways and means for supplying rectified A.C. current to sound equipments but have been deterred by certain considerations from introducing their plans.

Come what may in sound picture developments within the next few months, one thing is certain: the use of storage batteries is a thing of the past, and the sooner a realization of this point becomes general, the better.

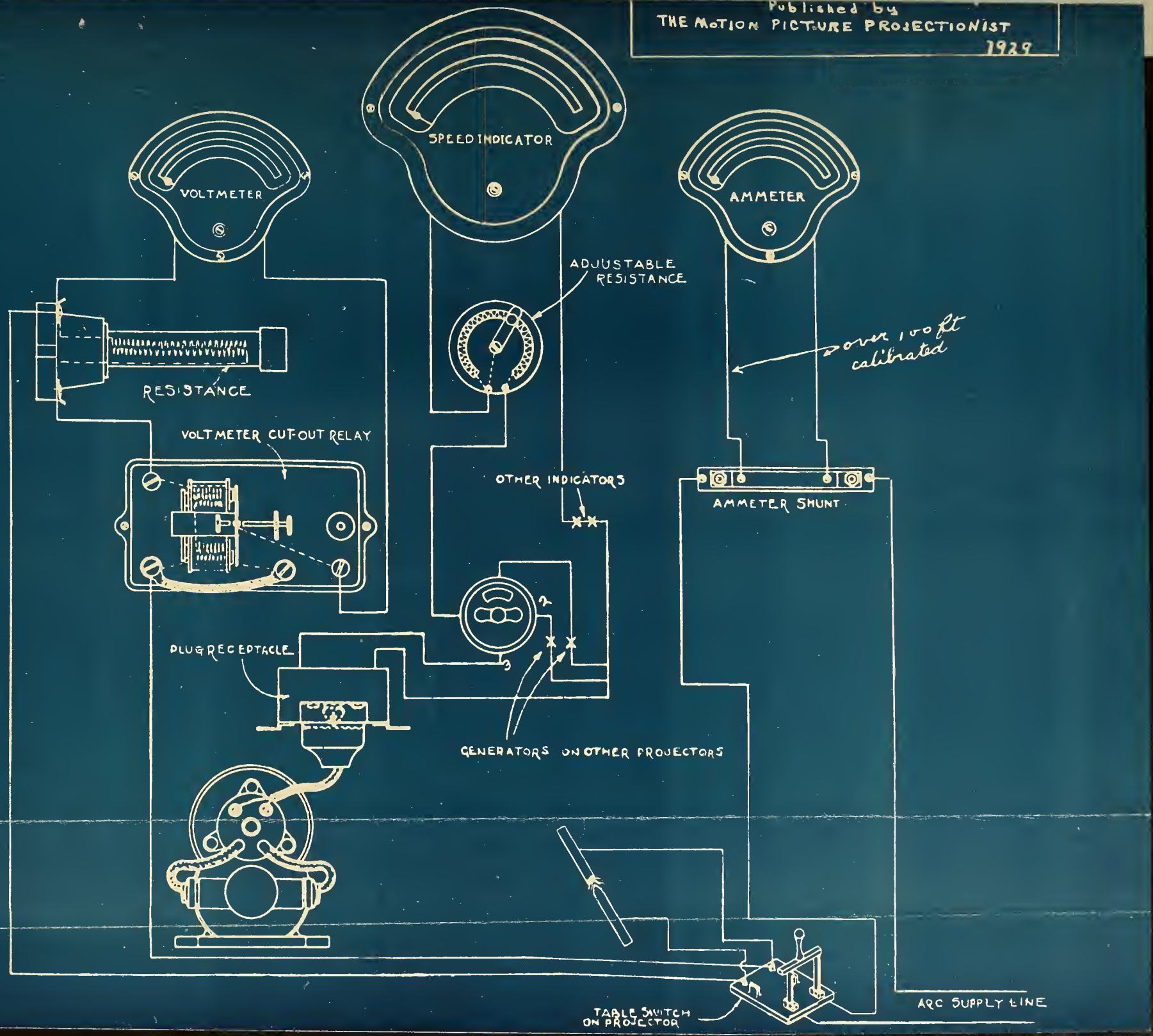
¶ *Educational Facilities*

OUR remarks in the last issue on Local Union educational societies apparently was very timely, judging from the number and tenor of the comments we received on this point. We wish to reiterate at this time our firm belief that every Local Union should assume the responsibility of launching an educational society, a society which would be something distinctly apart from strictly organization matters but which should be under the direct supervision of Local Union officers. Furthermore, such meetings should be restricted to educational matters only, for only in such a way can the success of the enterprise be assured. To the cry that "It can't be done" our answer is the citing of numerous cities where it *has* been done.

Attracted by the wide publicity which sound pictures in general and the projectionist in particular have received of late, several persons and groups of persons have hit upon the not original idea of disseminating information on sound projection via the correspondence method. It is inconceivable that any experienced projectionist would be gullible enough to pay his money for enrollment in any such "school," yet the danger of such enterprises lies not alone in mulcting the unsuspecting of their money but in the fact that the advertisements of such "schools" seek the patronage of those outside the industry with promises of the glowing "salaries" to be made as sound projectionists.

From our point of view, the surest method of combatting such promotion schemes is for the Local Unions to provide their memberships with educational facilities which will place at the disposal of the individual projectionist a means of securing reliable information on his work. This responsibility is squarely up to each Local Union, and we can see no good reason for shirking the task. Let's work on the theory that the best defense is a strong offense.

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The Grandeur System

By JAMES J. FINN

FOX FILM CORPORATION has introduced a new wide film system which is now running at the Gayety Theatre on Broadway, New York City, constituting the first public showing of a new film size which, it is predicted by motion picture executives, will quickly displace the present standard size film. It is claimed for the Grandeur system (as well as for other wide film processes), that the picture reveals a stereoscopic effect—third dimension. The writer witnessed showings of all three systems now available—Spoor-Berggren (RCA); Magnafilm (Paramount), and Grandeur—but he failed to see in any one of them anything even approaching a stereoscopic effect. As previously stated in these columns, the mere "illusion of depth" which is conveyed by all wide film does not lend a stereoscopic effect. Wide film does offer the opportunity for panoramic background and marvelous detail of objects far distant from the camera, but these advantages must not be construed as stereoscopy.

The projectionist's chief interest in Grandeur lies not in the fact that it is a wide film system but rather in considering the changes which wide film will effect in his daily work—the type of equipment which he will be called upon to use, the manner in which the projection problems are overcome, and so on. The sponsors of wide film are rather secretive about the details of their respective equipments, thus complete information on the systems is not readily available. However, such information as is available about the Grandeur system should be sufficient to convey to projectionists some idea, however slight, of just what the equipment is like and just how its introduction will affect their daily projection routine.

All of the Grandeur apparatus was developed by the engineering staffs of Fox Film Corp and General Theatres Equipment, Inc., the latter a newly-formed company which includes some of the leading manufacturers of projection equipment. The research work on Grandeur was under the direction of Mr. A. E. Sponable, Fox-Case Corp. engineer who was prominently identified with the development work on Movietone. The camera used is made by the Mitchell Camera Corp. of Hollywood, also members of General Theatres Equipment, Inc.

Projector Changes

The principle of Grandeur pictures is not that of magnification. The camera used is equipped with a new type lens which records an image of greater scope than has ever before been achieved, using film 70 millimeters wide—twice the size of the present standard film. The accompanying illustration shows the comparative sizes of Grandeur and the present standard film. The sound track on the former is twice the size of the one now in general use.

The projector used for Grandeur presentations was made for Fox by The International Projector Corp., manufacturers of Simplex projectors. It is understood that the entire head and sound compartment of the Grandeur projector is one casting, although provision has been made for detaching these sections, if desired. Thus far only two Grandeur projectors have been turned out. It is possible to fit the regular Simplex projector for Grandeur pictures, although it is conceded that the results thus obtained are not wholly satisfactory. Good results with wide film demand a special projector for the job, as has been evidenced by this first showing in New York, where a comparison between the quality of picture delivered by the Grandeur projector and that of the ordinary projector fitted for the task shows the former to be far superior.

Changes in the projector for Grandeur film are confined in the main to an enlargement of all working parts of the mechanism and, of course, a larger film gate. It is interesting to note that Grandeur does not employ compressed air to hold the wide film in a perfectly flat focal plane at the aperture but instead uses a film gate of special design, which curves outward toward the screen. This curve maintains the film in a perfectly flat plane as it passes the light, thus insuring buckle-free film. It is not known what provision, if any, has been made for warping.

50′ x 32′ Maximum

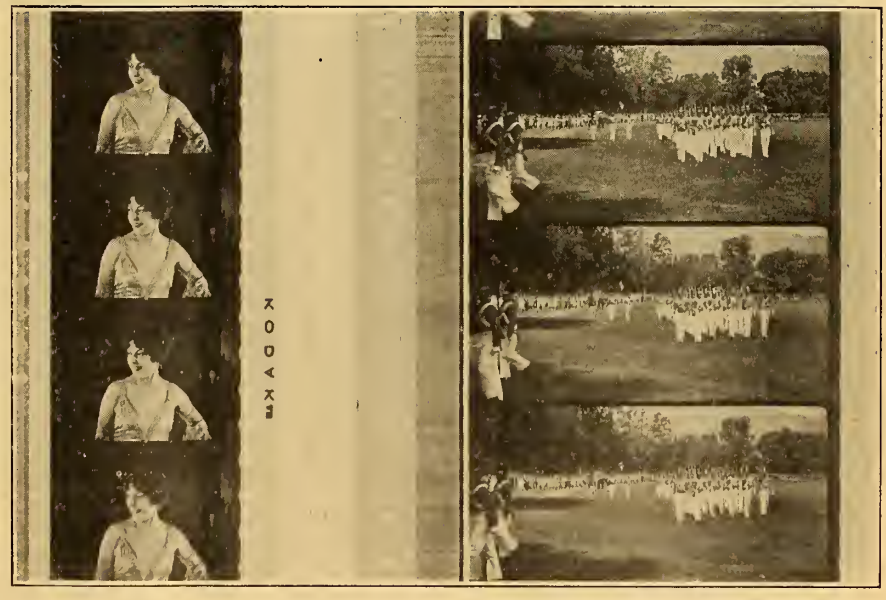
Grandeur will give a picture 50 feet by 32 feet, but a smaller picture may be had depending upon the individual requirements of theatres. At the New York showing the proportions of the picture are 32 feet by 18, the Gayety being a small theatre. When shooting a picture the camera runs at 90 feet per minute; in reproduction, the projector runs at 78 feet per minute. The sound sprocket is regulated to run at 360 r.p.m. A special 12-volt exciter lamp with a wider, huskier filament is used. The slit is twice the ordinary size. Other sound units are the same. The horns are placed at each end of the picture, instead of at the center, as is now the custom.

Grandeur requires from 130 to 160 amperes, depending upon the size of the theatre. At the Gayety Theatre, on a 60-foot throw, the amperage is about 130. A special quartz condenser is used to withstand the terrific heat. All projector gears are twice the ordinary size, with larger and stronger teeth. There are no changes in the screen used, excepting, of course, that it is very much larger.

Improved Model Likely

It is understood that subsequent models of the Grandeur projector will incorporate certain improvements which have suggested themselves since the first machines were made. It is likely that the production of Grandeur projectors will not be entered into on a large scale for some time, although Fox will probably order more machines for showing the new system in key cities. Despite the fact that results with an ordinary projector refitted for the new film are not wholly satisfactory, it is likely that these machines will be utilized for showings in the immediate future.

One serious problem posed by the introduction of wide film is that of aperture size. With Grandeur being 70 mm., Spoor-Berggren 62 mm., and Magnafilm 56 mm., it is not unlikely that the same troubles encountered when sound pictures were introduced will have to be again overcome. Adjustment is impracticable in the theatre, although nothing in the present attitude of the producers of wide film would seem to indicate that a standard size will be agreed upon.



Film clips of present standard size film and that used in the Grandeur system

Elementary Electricity

By ELLIOTT STRICKLAND

II. *Magnetic Properties of Matter—Inductance—Impedance—Condensers and Their Properties—A. C. and D. C.—Series and Parallel Connections—Electromagnetic Fields—Transformers*

MAGNETS may be defined as of three kinds—a natural magnet, an artificial magnet, and an electric magnet. The natural magnet is one which nature formed of some material which has the faculty of attracting or repelling other pieces of material, such as iron or steel. When a piece of hardened steel is rubbed with a natural magnet it will acquire some properties of the natural magnet and become what is known as an artificial magnet.

Certain materials such as iron and steel keep these magnetic properties for a long time: they are known as permanent magnets. A shape usually employed is a bar bent in the shape of a horseshoe, with a piece of soft iron usually placed across the ends to retain the magnetism.

In electricity, the two free ends of the bar which has been magnetized are called poles, one being the north pole and the other the south pole. In magnetism, as in electricity, the same general law governs, namely, *like magnetic poles repel and unlike magnetic poles attract.*

There is a space around a magnet which will attract or repeal other magnetic substances. This is known as the *magnetic field* of the magnet. It has been found that this field acts along certain definite directions and lines, these lines being known as the magnetic lines of force.

This can be tried out by placing a bar magnet on a table and putting a piece of paper above it; then sprinkle iron filings on the paper; the filings will immediately shape themselves. An electrical magnet is one with a number of turns of wire wound on a bar of steel and an electrical current passed through these turns of wire. As soon as the latter is done, the bar of iron or steel becomes a magnet of a strength dependent on the number of turns of wire and the voltage applied. When the exciting medium is removed it will be found that there will be a small amount of magnetism retained in the bar, and this is what is known as residual magnetism.

Inductance

Inductance of a coil or a straight conductor is that faculty which it has for storing energy in an electro-magnetic form known as magnetic flux. By self inductance is meant the inductance produced by current in the circuit or winding itself by the current in the circuit or winding setting up a flux within itself. The unit of this inductance is the *heury*. As this unit is very large, one one-thousandth part of it is used and is called the *milliheury*. If a smaller division is required, it is called a *microheury*, which is one one-millionth part of a heury.

The faculty which the magnetic characteristics of a coil has to stop the passage of an alternating current is called its inductive reactance and is measured in ohms. This reactance acts as a barrier to the passage of an alternating current in addition to the regular resistance of the coil. There are several different inductance devices of which the following are a few:

A choke coil is a coil of wire wound on an iron core and which therefore has more reactance than an aircore coil.

An inductance coil, either fixed or variable, is a coil of wire accurately wound on a non-magnetic core in two sections so as not to cause any external field. If the winding is tapped or made so that a different number of turns may be used it is a variable inductance. If the windings are fixed, it is called a fixed inductance. Honey comb coils and variometers are also used considerably and are merely a different type of construction of the two described above.

Impedance

The total opposition which an alternating current has in flowing through a circuit is known as its *impedance* and is expressed



Some of the delegates to the New York State Association of Projectionists' meeting. Reading left to right: John E. Meaney, Syracuse; Joseph Stoppelo, Glens Falls; Jack Winick, New York City; Harry Brophy, Rochester; Charles Skinner, Utica; John M. O'Hanlon, chairman, Legislative Committee, N. Y. State Federation of Labor; L. R. Boyd, Syracuse; John Sullivan, President, N. Y. State Federation of Labor; Edgar T. Stewart, New York City; C. A. Ditticauer, Elmira; Glen Humphreys, Utica; C. E. Qinstrelle, Syracuse, and Harry Brooks, Troy.

in ohms. The impedance of a circuit is the resultant of the effects of the resistance, inductance and capacity of the circuit. When the inductive and condensive reactances are equal and their effects are neutralized the circuit is said to be in a state of resonance.

Condensers: Their Properties

An electric condenser is an electrical device which has the faculty of storing up a large quantity of electrical energy in a static form. It consists of two conductors, or two groups of conductors, separated by some insulating material called a dielectric. The conductors or groups of conductors are generally flat and are called plates.

Condensers are made either variable or fixed: if variable, the plates are so arranged that varying surface area of the plates may be obtained ranging from zero to maximum. Different non-conductors or dielectrics have different properties; air is taken as a base from which all other constants are derived. The capacity of a condenser is proportional to the plate area; and connecting condensers in parallel simply increases this plate area. Thus, the total capacity of a bank of condensers in parallel is equal to the sum of their individual capacities.

If several condensers are connected in series their joint capacity is equal to the reciprocal of the sum of their reciprocals. Thus:

$$C = \frac{1}{\frac{1}{c_1} + \frac{1}{c_2} + \frac{1}{c_3}} = \frac{1}{C} =$$

$$\frac{1}{\frac{1}{c_1} + \frac{1}{c_2} + \frac{1}{c_3}}$$

The unit of capacity is called the *farad*. A condenser having a capacity of one farad would be impractical for amplification work, and a smaller unit is used called the microfarad. Thus:

$$\text{Microfarad} = \frac{1}{1{,}000{,}000} \text{ farad}$$

A.C. and D.C.

The two general classes of electric currents, namely, alternating and direct, are descriptive of their characteristics.

Direct current is a flow of electricity in one direction only, such as the flow of a current from a battery; this flow is continuous in one direction only and therefore battery current is known as continuous direct current. The flow of electricity from dynamo electric machines, which generate direct current has certain variations due to inherent defects of design and construction which cause it to pulsate to a slight degree, and therefore this kind of direct current is more or less wavy and is sometimes called a pulsating direct current. It can be readily seen from the above explanation why it is of great importance to use batteries if a steady, even flow of current in one direction is desired.

When the flow of electricity reverses its direction at periodic intervals it is called alternating current. Each reversal is called an alternation, and two alternations are called a cycle. An alternating current consists of a certain number of cycles per unit of time, designated as the frequency. For example, a 60 cycle current means that the alternating current is 60 cycles or 120 alternations per second or, 3,600 cycles per minute, or 7,200 alternations per minute.

Series and Parallel Connections

All sources of electric current may be connected to an electrical circuit by conductors in various ways: series, parallel or multiple, and series-parallel or series-multiple. A series circuit is one which is formed so as to provide one continuous path for the flow of the electrical current.

Each branch of a parallel circuit is a shunt of the other. It would be well to explain here just what a short circuit is: A short circuit is a circuit which has been shunted by a low resistance conductor. When batteries or other sources of electric current are connected in series, namely, the positive of one source to the negative of another, the total voltage is equal to the sum of the individual sources. In the event of any source of electric current being connected in series in the opposite direction—positive to positive—the voltage of the unit so connected should be subtracted.

Electromagnetic Fields—Transformers

Parallel connections of batteries or other electrical sources should never be made when the units have unequal voltages. A parallel connection of an electrical source consists of connecting together all the positive terminals and all the negative terminals. The total voltage of such a connection is equal to the voltage of an individual unit, but the current capacity is increased by a multiple of the number of such units connected in parallel.

An electromagnetic field is a magnetic field which is set up in the medium surrounding a conductor carrying electricity. This field is often represented by lines of force which, if the conductor is separated, form concentric circles about it. These lines of force act on a compass needle just like the field of a permanent magnet.

A transformer is an electrical device used for transforming an alternating current of low voltage and high current to an alternating current of higher voltage and lower current, or vice versa. The output wattage remains the same as the input wattage, subject, however, to the subtraction of losses due to design, etc. If the transformer delivers an output of a higher voltage than the input it is called a "step-up" transformer; and if the transformer delivers a lower voltage than the input it is called a "step-down" transformer. Direct current cannot be stepped up or down in this manner. To do so some form of machinery, such as a motor generator, A.C. to D.C., must be used.

An alternating current transformer consists of two coils of wire known as the primary and secondary. The primary coil is always the input coil and the secondary the output coil. These two coils are generally wound so that they have a common iron core. This iron core is composed of thin sheets of iron or laminations. There are several other types of transformers, but the one described above is most frequently used in amplification.

The ratio of transformation is dependent on the number of turns of wire in the primary coil in relation to the number of turns of wire in the secondary coil. For instance, in a transformer having 100 turns in the primary and 1000 turns in the secondary, the voltage increase will be of the order of 1 to 10 and the current 10 to 1.

Urge Standard Apertures, Illumination and Prints

CORRELATION of practice on camera and projector apertures, screen illumination, and a standard release print reel was advocated by a joint meeting of the Academy of Motion Picture Arts and Sciences (Technicians' Branch), the American Society of Cinematographers, and the Los Angeles chapters of the Society of Motion Picture Engineers and the American Projection Society.

Results of Survey

A resolution was adopted, based on the report of a joint committee which conducted a national survey of theatre chains and production studios, in which it was found that an increasing number of theatres are restoring the three-by-four full screen proportion by matting off the top and bottom of sound-on-film pictures. The technical societies jointly recommended that, although the whole frame is to be photographed as at present, all vital portions of sound-on-film pictures should be composed within an area of 0.620 by 0.835 inches, so that in theatres which use a smaller aperture the heads and feet of characters will not be matted off.

Prints and Illumination

It was also recommended that theatres which make a practice of restoring the full screen proportion from sound-on-film pictures do so by the use of an aperture whose size would be 0.600 by 0.800 inches, on the basis of projection on the level, the horizontal center of the aperture coinciding with that of the S.M.P.E. standard aperture.

Joint committees from the technical societies were also authorized to investigate and make recommendations on release print standardization and screen illumination.

Aid to Framing

The present variation in the length and marking of the leaders on prints from different studios and laboratories and the difficulty encountered by projectionists when no silent frames are allowed at the beginning and ends of reels for change-over will be included in the investigation. Frame lines marked in the leader for accurate framing of sound-on-film pictures, and more conveniently legible part numbers will also be considered for recommendation.

HYSTERICAL PRICE SLASHING, inferior equipment, and sugar coated promises will not solve your sound problems. The answer lies in the other direction.

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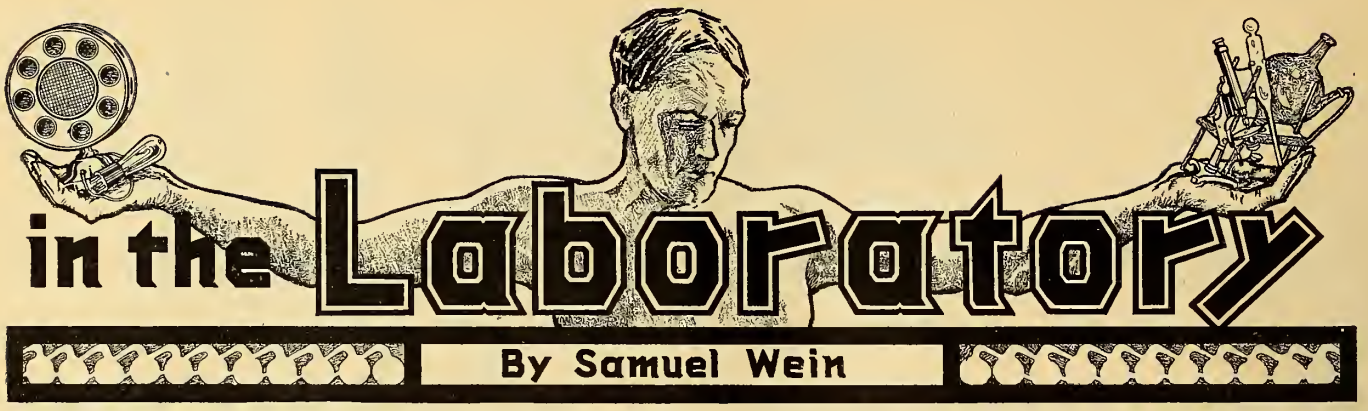
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Light Sensitive Cell Amplification

IN the July issue (page 19) we discussed the matter of the "patent situation" relating to the use of a "slit" in sound motion picture systems. In the discussion we pointed out several ideas outlined to us by workers in the art in which the use of an "optical slit" was advocated in preference to a "mechanical slit." That the optical slit is the logical thing to use, irrespective of the matter of alleged "patent rights" is attested to by the ever-increasing number of systems which are being fitted out with optical slits. The use of a mechanical slit will in future be a matter of reference work only.

As a result of publishing the technical and patent literature on the optical slit, the writer was deluged with requests from workers in the art for further details as to other phases of the literature. One point which drew the greatest number of requests was the amplification situation.

Von Lieben

Before entering the discussion of the outstanding facts of this situation, we suggest that our readers refer to their back issues of this publication, notably those for August, September, October and December of 1928, for data as to the different types of cells known. This data will serve as a guide for the following discussion.

Unquestionably the first investigator to attempt amplification by use of a light sensitive cell was von Lieben.[1] It might be mentioned here that von Lieben was one of the carliest investigators to experiment with the use of a "grid" in the "diode tube" (hot filament and plate). It was at about the same time that Dr. De Forest made his epochal contribution in the form of the three-element tube. The physical shape of the amplifier tube made by von Lieben was altogether different from that in common use today, and, as might be expected, the characteristics of the tube were a matter of speculation.

However, von Lieben, in experimenting with the sensitivity of the three-element tube for minute electrical impulses, took a selenium cell and connected it in a circuit similar to that shown in Fig. 1. Here the selenium cell is shown at A, a non-inductive resistance at B, a source of potential at C, a suitable indicating meter (milliampere meter) at D, and, of course, the three-element amplifier tube at E.

All Elements Long Known

A suitable grid potential is attained by the variable resistance B. Now then, if the adjustment of the grid potential is properly made, no reading will be evident on the meter when the cell is in the dark. On the other hand, if the cell be exposed to a source of illumination, a deflection will be seen on the meter, this deflection depending directly upon (1) the amount of light falling on the cell, and (2) the potential applied to the meter circuit.

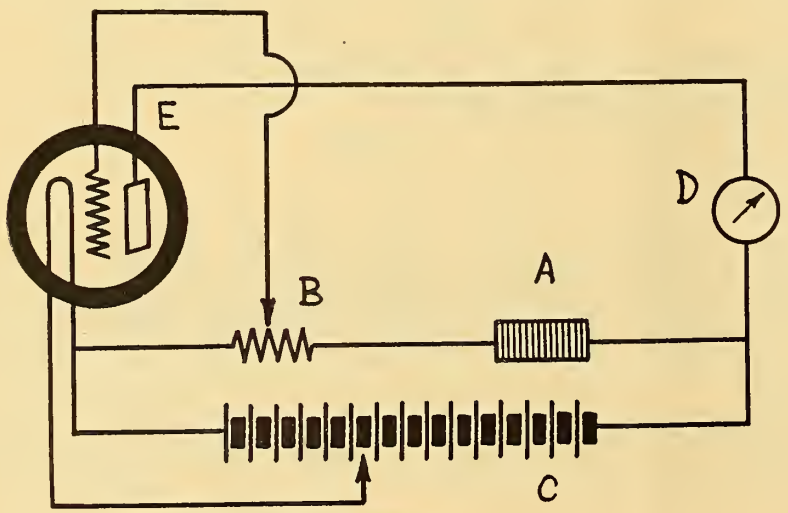


Figure 1

There may be some who will take exception as to the practical value of this citation, but it cannot be said that it does not contain all the elements now in common use for light sensitive cell amplification.

Others may take issue with us as to the use of a selenium cell in the circuit, yet it is well to recall that a selenium cell, while it is not technically classified as a "photo electric effect," is commonly classified as a "light sensitive cell." The U. S. Patent Office does not differentiate between types of light sensitive cells, and the mere substitution of one type of cell for another does not warrant patent "protection," *unless a new result is obtained by the substitution of one type for another.* The mere substitution of one form of light sensitive cell for another is but a matter of technical skill to attain the best results.

Thus far we have seen that it is possible by means of a three-element vacuum tube to amplify a weak electrical impulse resulting from the exposure of a light sensitive cell to a source of illumination.

Another outstanding contribution which will be the subject of considerable discussion in the course of a pending patent fight will be the "cascading of tubes as a means for amplifying." Von Lieben, Reisz and Strauss[2] in 1911 showed how the plate circuit of the first tube was connected through the primary of a transformer, the secondary of which was connected to the grid of a second tube. Thus the combined effect of two tubes and transformer coupling eliminated the use of a pair of telephone receivers for a loud speaker. The results obtained with this method were crude because of the instability of the circuit.

[1] *Elektrotech. Zeit.*, Vol. 48, pg. 1359, 1913.
[2] *French patent No.* 13,726 *of* 1911.

Disc Troubles

Recently we witnessed a performance of sound pictures in which the sound accompaniment was taken from discs. One sequence of the picture showed the death scene of a lover, and much to our surprise we could very easily hear giggling and loud laughter from horns.

With the kind permission of the theatre manager, we soon found what constituted the reason for this. Due to the vibration of the slow-moving mechanical coupling

between the projector and the disc, variations in the record speed arose, so that the disc would oscillate in its revolutions. By this we mean that the driving speed was constant, but the disc itself has a tendency to go slightly faster and then slightly slower than the driving speed. Technicians privately refer to this condition as the "wows," which are particularly noticeable on sustained notes.

The difficulty may usually be traced to the universal coupling that connects the projector and disc turntable. Various mechanical filters are used to offset this difficulty, but these have been used with little success thus far. These filters generally consist of some high friction material, such as asbestos soaked in grease and rubbing the flywheel which is connected by springs to the drive shaft and directly to the disc. Other mechanical means are also used, but they fail to do the required work.

The ideal method of eliminating this difficulty is to use a multi-phase generator on the same shaft with the motor that drives the projector. On the disc is a synchronous motor which rotates at high speed and is driven by a generator on the motor shaft. The disc motor should be coupled by a worm gear directly to the disc. The advantage of this is that all parts of the machine would maintain a constant speed and there would be no place like a universal joint or coupling to permit a variation in speed.

What happens is this: as the speed of the projector increases so will the generator frequency increase; this gradual increasing frequency will bring the synchronous motor on the disc up to speed exactly in phase with it.

More Light on the Photo Electric Cell

There recently appeared in one of the leading New York City newspapers an attack on the photo electric cell as the device which gives the most difficulties in the reproduction of sound from film. The comments made were that the photo electric cell is "insensitive" and "does not respond directly" in proportion to the amount of illumination to which it is subjected.

Such is not the case. The photo electric cell is used in astronomical observatories as a means for measuring light only because of its extreme sensitivity to light and because of its proportionality and "straight line characteristics" that make it adaptable for such precision work. This fact alone is enough to make the above mentioned comments baseless.

In our opinion the trouble lies with the source of illumination, i. e., the exciting lamp, and the amount of light passing through the film onto the photo electric cell. As a matter of fact, the average optical system throws on the film less than one-half of one per cent. of the available light emanating from the exciting lamp, as measured by a photo electric photometer. This makes it imperative that a sensitive photo electric cell be used.

Soft vs. Hard-Vacuum Types

The most sensitive type of photo electric cell is the "gas-filled" type. In past discussions of this type of cell we have pointed out that it has no straight line characteristics, and because of this fact alone do we get distortion of the sound as the result of using this type of cell. Theoretically it is possible to concentrate as much light as is desired with an optical system. It is therefore obvious that considerably more light can be made to fall on the photo electric cell and therefore insure a greater percentage potential change as a result thereof.

The hard-vacuum type of photo electric cell has a straight line characteristic and is less sensitive to lower light intensities. If it were possible to get enough light through the optical system to work a hard-vacuum type cell, a great deal of distortion could be eliminated.

It is interesting to remember that the average power ratio between the output of a hard-vacuum and a "soft" cell is about 100 to 1 in favor of the gas-filled type.

Sound Picture Patent Situation

By H. R. VAN DEVENTER *

This is the second of a series of articles by Mr. Van Deventer under the general heading "The State of the Art From the Patent Standpoint in Respect to Sound Motion Picture Systems." Subsequent articles in the series will treat in detail the patents cited in these introductory installments.— THE EDITOR.

A VERY complete description of a modern method of recording and reproducing sound is given in the *Bell System Technical Journal* for July, 1928, beginning on page 493. This paper describes in detail a preferred form of electromagnetic recorder and includes a complete mathematical treatise as well as detail drawings of the preferred form of apparatus not only for recording but for reproducing. However, the reproducer shown is not of the electrical pickup type.

Patent 1,655,843 pertains to a method of regulations or control during the time of making the sound record that will indicate any tendency to "overcutting" by the recording stylus due to any excessive sound amplitudes.

Patent 1,662,168 is directed to an automatic control that will interrupt the sound reproduction while the speed of the phonograph motor is undergoing variations. The scheme of this patent is applicable to a very sensitive method of reproduction using an electrical pickup in place of the usual phonograph stylus and sound diaphragm.

The electrical pickup device which has afforded the Vitaphone its commercial advantages up to the present time is largely a matter of the amplifier used. The Movietone and Phonofilm systems record the sound on the side of the picture film, and these will be discussed later.

The patent situation in general in respect to electrical recording (and this also applies to reproduction), is briefly as follows:

Patent No. 1,570,297 to Dyer shows an electrical pickup.

Patent No. 1,593,735 to Vreeland, et al., shows means for using a series of transmitters for receiving the sounds to be recorded.

Patent No. 1,599,418 to Kellogg shows an electrical pickup connected to a transformer for impressing the impulses on the grid of an amplifier tube and a potentiometer for controlling the strength of the impulses going to the transformer.

Patent No. 1,603,207 to Mills shows a detailed method of modulation.

Patent No. 1,617,428 to Wier covers an electrical pickup with filters in the circuit for taking out undesired tones.

Patent No. 1,620,122 to Muttscheller, an electrolytic method of recording.

Patent No. 1,655,843 to Reynolds, a method of preventing overcutting.

Patent No. 1,678,491 to Goldsborough, a combined radio and phonograph recording and reproducing system which may be used as an ordinary radio set or as a recorder for phonographic records or as a reproducer. Claim 1 of this patent is of importance in connection with such combination machines.

Patent No. 1,677,806 to Weinberger, an electrical pickup and circuit for the same.

Patent No. 1,685,913 to Espenscheid, recording and reproducing sound waves, electrically recording with an electrical pickup for reproducing and a method of correcting distortion.

Patent No. 1,689,524 to Fortin, an electromagnetic pickup of a special character, mainly for use with piano sound boards.

Patent No. 1,695,564 to Thorington, means for the radio translation of phonographical recorded sound waves showing both a magnetic and capacity pickup. This shows a type of pickup of interest.

Patent No. 1,702,438 to High shows an electrostatic or capacity pickup.

Patent No. 1,711,551 to Sykes, an electrical method of recording with an electrical pickup.

Means for Synchronizing the Sound Record Picture Film

The construction and arrangement of the synchronizer depends on a number of factors, such as whether the sound recording and the taking of the picture is done side by side, or the recording done at a distance, and on a number of other factors.

Gaumont's patent No. 1,144,339, patented June 22, 1915, illustrates a hand-operated projector and a motor-operated phonograph, connected together by a differential, the differential being used to move the indicator or indicators so that the operator may be warned to increase or decrease the speed at which he is cranking the projector, and thus synchronize the same with the phonograph and bring the index back to the zero position.

Each of the five claims of this patent are directed to such an indicating device or index number and obviously will not be infringed by any mechanism not employing the latter.

(To be continued)

* Consulting Engineer and Solicitor of Patents, New York, N. Y.

The "Kink" Department

IT is the purpose of this department to present each month helpful working hints for the projectionist so that he may more easily and more quickly dispose of the many necessary small jobs attendant upon keeping his equipment at high operating efficiency. Many projectionists have their own little "kinks" for performing this or that task of their daily routine, and this department will provide a place where all such ideas may be exchanged for the mutual benefit of all. Ideas on all projection room equipment—projectors, lenses, sound equipment, screens, etc.—are suitable for this department.

The cooperation of all our readers is solicited to the end that this department may be of real service in the matter of supplying a steady flow of helpful hints on daily routine. The simpler the idea the better; and no one should hesitate to send in his idea merely because he may have used it for a long time. The man in another city may not have heard of a particular "kink" which may make it possible for him to do many little tasks quickly and cheaply.

The following "kinks" are supplied as a starter. Get busy and send in your hints to the Kink Editor.

Locating Knocks and Squeaks

Squeaks are caused by dry bearings, dry gear boxes, tight collars, bent shafts, loose screws, etc.; and knocks may be traced to the same source. When a squeak or knock develops, it is usually hard to locate because of the fact that the projector mechanism is rather noisy.

A screwdriver may be utilized to locate squeaks and knocks. Take a screwdriver, at least a foot long, and press the blade edge against that part of the mechanism which you think is causing the noise. You hear the real sound of the gears or shaft movement in the vicinity of the screwdriver blade. By moving the screwdriver in the direction from which you think the noise is coming, the noise of the knock or squeak will gradually grow louder. Your ear will detect when you reach the source of the noise.

Record Marker

It has been found that a "China marking pencil" is best suited for marking on disc records. Ask for this marker by the above-mentioned name at any stationery store. It costs not more than ten cents.

Greasing Gear Systems

For greasing Western Electric system gear boxes, remove the square head screws, closing the grease inlets. Put in their place "alemite" grease cups. Use an "alemite grease gun" for the purpose.

A Handy Tool

A cheap but efficient tool for removing the hexagon screws that bolt down the mechanism (head), to the base of the Simplex projector may be made thusly: Visit Woolworth's and buy at the accessory counter a flat ratchet, a hexagon socket (½ x 9/16 inches), and one hexagon rod. This rod will probably have one end bent like an "ell."

Take the rod and socket to a welder and have him straighten out the ell and braze the ½-inch socket onto the rod. You will then have a ratchet wrench that will save you labor and do a good job.

The Sound Gate

A handy place for the sound gate (W. E.) is on the projector room wall directly in front of you. The way to make it stick is to hammer two nails 1¾" apart on the wall so that the heads stick out about 3/16". The sound gate will slide down the tracks so formed and will hang there right in front of you, yet in an out-of-the-way place.

Battery Stunt

Where old-type amplifying systems are used (W. E.), one having many A and B batteries, a quick way to water all of the batteries is to use a rubber enema bag with a long hose and a thin nozzle. Be sure to have a water stopper of some kind on the hose to shut off the flow of water when the proper level of water has been reached.

Disc Record Wiper

Keep a small whiskbroom handy in the projection room for use in cleaning the cloth on the turntable, and for cleaning the disc wiper. The plush on the wiper accumulates the dust from the records and from the air, and when a record is wiped over with a dust-laden wiper, it will cause scratches and seriously impair the surface of the disc.

The wiper should be thoroughly brushed after every three or four times it is used.

Book Review

A.B.C. OF TELEVISION—By Raymond F. Yates. 210 pages with 78 illustrations. 6 x 9 inches. Stiff bucram binding. Published by N. W. Henley Publishing Co., New York City. Price, $3.00.

The author of this book, Raymond F. Yates, was formerly editor of *Television,* the first American magazine to be devoted exclusively to the interests of television, and accordingly his comment on the subject is without doubt authoritative. Mr. Yates was formerly editor of *Popular Radio,* and is the author of a number of textbooks on radio and its allied arts.

A. B. C. of Television is intended primarily for those "practical minded experimenters" with a view to serve as a means of "useful information" to those seriously interested in building a television outfit. It is, however, more than a mere exposition of ways and means for building an experimental television apparatus, for Mr. Yates's introductory chapters cover most completely the entire subject of television.

Following the first two chapters in which are outlined the essentials of television, are discussions of the following phases of the art: telephotography (transmission of still pictures); the photo electric cell and its method of amplification; the visualizing source of light (the neon tube); the selenium cell; "scanning the image"; methods of synchronizing the transmitting and receiving scanning discs; and, finally, details on the construction of experimental home transmitter and receiver units.

The book is a valuable contribution to the knowledge of the art of television. It is written in simple and concise language, and Mr. Yates in his discussions of the various phases of the art suggests no questions for which he does not provide the answers. All information is set forth in such a manner that even the non-technical layman should have little difficulty in grasping the essentials of television. The circuit drawings and the photographs comprise an excellent group of illustrations for such a work, and anyone familiar with the structure of radio devices may glean from this book sufficient information to enable them to build a home transmitting and receiving apparatus.

The book is recommended to all those who are interested in obtaining a complete yet readily understandable work on television. One need not necessarily intend building an apparatus to enjoy this work, for among its pages will be found the answers to the majority of questions which are being asked today about this new art

Metal Screen for Tone and Color

A metal motion picture screen for the showing of sound and silent pictures in daylight or darkness, said to be especially receptive to color and represented as requiring one-fifth as much amperage for projection as the ordinary screen, was demonstrated recently. The screen is the invention of Dr. Gabriel Weinschenker, a Russian surgeon.

The screen is made of nickel-plated copper strips, four one-hundredths of an inch in thickness. Upon each strip are thousands of tiny squares that have been stamped on in such a way as to reflect the light directly into the audience rather than in all directions. In this way, it is claimed, the tints in color pictures are preserved and an added brilliance is obtained. For purposes of contrast, an ordinary screen was placed over one corner of the Weinschenker one. It was observed that while the image on the new one was not as smooth as that of the other it possessed a radiance approaching natural sunlight.

The screen is backed with a perforated terne plate that has been punctured to permit the passage of sound. A phonograph record was played through the screen without distortion of sound.

The device will be sold for approximately $1,000.

Sound Projection Problems

By R. H. McCULLOUGH*

NOT more than a year ago sound reproduction, in theatres, was only a novelty, but now it is a popular, legitimate entertainment. Theatre patrons now can very easily determine the difference between good and poor sound reproduction. Good projection is required along with good sound. The one great question which is before the entire industry at the present time is the restoring of the Movietone picture to normal size. Many projection departments in theatres have solved this problem, but not to the satisfaction of the producer.

There are two methods used at the present time to restore the Movietone picture to normal size. The lens method is used in many theatres. The practice of using a masking piece, attached to the screen, so that it may be pulled on and off the screen as desired to cover up the space omitted, because of masking the sound track at the aperture, is also used in many theatres. There are several theatres where they do not use anything. Of course, we do realize that the importance of this subject has been dealt with very lightly by producers. However, it is one of the most important of subjects and one to which everyone in the industry should endeavor to give consideration.

Picture Dimensions

First of all, we have to give a dignified sound picture performance. Two picture sizes are objectionable in any theatre, when the same height remains and the width is reduced. When Vitaphone or silent subjects are being presented, they are normal width and height; but when Movietone subjects are presented, it is not only necessary to mask the sound track at the aperture, but the space on the screen, which is omitted, must be taken care of.

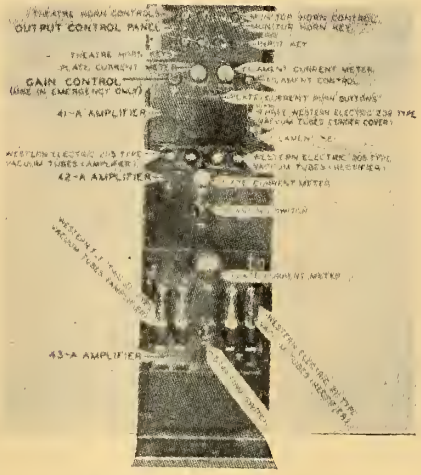
The Movietone picture appears very square in theatres having steep-angle throws, and our audiences are not accustomed to this type of projection. Manufacturers of sound equipment have not made any effort toward helping to correct this unsatisfactory situation.

By using a shorter focal lens and an undersize aperture, the present Movietone picture can be restored to normal size. This necessitates the changing of lenses and apertures when projecting Movietone and Vitaphone subjects. A clamp is usually placed around each one of the lenses, so that the focus will be unchanged when interchanging lenses. Fifty per cent. of our theatres use the lens method and the remainder are using the screen masking piece.

The ERPI Base

As most of you know, the present Electrical Research Products, Inc., Universal Projector Base cannot be moved sideways. This is one reason why more theatres are not using the lens method for restoring the Movietone picture to normal size. When using the lens method it is necessary to center the Movietone picture on the screen, so as to compensate for half of the sound track width, and when using an undersize aperture, as the height is reduced proportionally.

We have many sound installations with the three point Type-S Simplex base, which can be moved sideways as desired. However, we have a few installations with the Electrical Research Products, Inc., Universal base using lens mounts on Simplex mechanisms, which can be moved slightly parallel sideways, and which centers the picture as desired, so that the lens method



W. E. amplifier panel

can be used. When the lens method is used we cut a portion off the top and bottom of the picture. We have requested a few studios to keep their objects within 19/32, so as to avoid this.

Masking Operations

When using the mask on the side of the screen it is either manipulated by hand or remote control. However, the operation is smooth, but the appearance is very undignified. The mask, called the Movietone Flipper, costs less to install than the lens method. This mask is installed and supported on a slote fastened to the top of the screen and is operated by an endless chain at the side of the screen. The width of this mask varies, according to the picture size. Cable clamps are clamped to the cable at two places, which act as stops, so when the mask is pulled on and off the screen, it will stop at the same place.

We do not believe either of these methods is satisfactory, as it is only a temporary method of correcting a detrimental condition in our theatres. However, the producers are the only ones who can correct this undesirable condition. Our recommendation would be to standardize on one size camera aperture in all studios, and that this aperture size be used when taking Silent, Movietone or Vitaphone productions.

Need for Standardization

We do realize that it would take some time for this to be worked out to everyone's satisfaction, but nevertheless it would improve a very serious situation. Theatres would have to change their objective lenses, providing they wished to maintain their present picture size, but not necessarily, because if the picture were reduced it would only require additional material to mat in the normal picture size to the reduced picture size and, also, all projector apertures would have to be changed to conform with the camera aperture size. This new aperture size would have to be proportionate to the normal size picture aperture.

The standardizing of one aperture size will eventually be adopted by many producers. However, we must not forget the fact that, probably within the next year, we will be projecting the wide film in many theatres and this problem will have to be gone over again.

Western Electric Amplifier

We have installed recently many of the 2-SX-41 Western Electric Sound Equipments. The amplifiers for the 2-SX-41 set are mounted on an iron rack usually placed behind the two projectors and close to the rear wall of the projection room. The amplifying system consists of three amplifiers, known as the 41-A, the 42-A and the 43-A, each of which is constructed as a separate unit and enclosed in detachable metal containers.

The speech output from each projector is carried to the Fader and then to the 41-A amplifier, which is a three stage resistance coupled amplifier using 239-A tubes in each stage. Over one half of the total amplification is produced by this amplifier. It raises the energy level of the reproducer to a volume suitable for the operation of the power amplifiers. It amplifies one hundred times and has a power output of nineteen milliwatts. The filaments of the three tubes operate on 12 volts supplied by storage batteries, and the plate potential is supplied by the 42-A amplifier at 390 volts.

Tube Equipment Details

The 42-A amplifier is a single stage push-pull power amplifier using four 205-D tubes operated entirely from A. C. supply and consuming about 80 watts. Two of these tubes are used as amplifiers and the other two as rectifiers, which supply the plate potential for the 42-A amplifier tubes and those of the 41-A amplifier. The 42-A amplifier amplifies 18 times and has a power output of 2.4 watts. The 43-A amplifier is also a single stage push-pull amplifier using four 211-E tubes, two of

* Supervisor of Projection, Fox West Coast Theatres.

which are used as amplifiers, the other two as rectifiers to supply the plate potential of 750 volts for the 43-A amplifier tubes. The 43-A operated entirely off A. C. consuming about 300 watts aand has a power output of 12 watts and amplifies 6 times.

Regulating Film Velocity

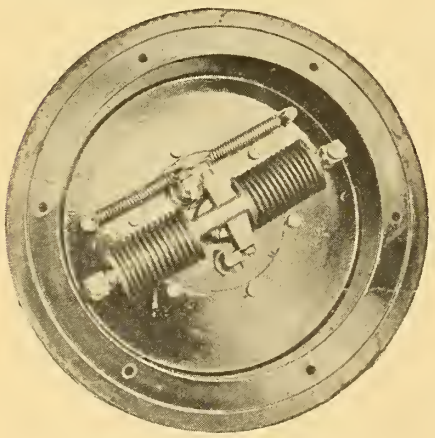
In film reproduction it is necessary that the film, as it moves past the light in the sound unit, have a uniform velocity. To accomplish this it has been found necessary to introduce another filter system between the sound sprocket and its driving gears very similar in operation to the one used on the turntable. It differs from the turntable filter and is hydraulic instead of frictional damping. The device works somewhat like an hydraulic shock absorber and successfully climinates changes in speed velocity of the film which would cause the sound to "flutter."

The filter systems for the film and disc units are absolutely essential for quality reproduction. Where they are eliminated in sound devices or where their operation is not sufficiently efficient due to improper design great trouble will be experienced in the use of such cquipment. Needle jumping from the grooves in disc record is a common fault of devices with faulty filter systems.

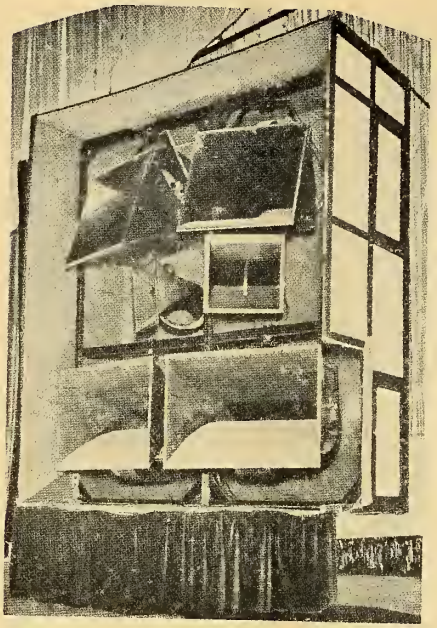
Handling of Stage Horns

The problem of what to do with horns while a stage presentation was on was only partially solved with the introduction of movable horn towers which permitted the rolling-off of the horns into the wings. The one objection of these towers was that they required much valuable stage space.

The Fox West Coast Theatres were the first to experiment with this difficult situation. We have many tramrail installations. This rail is elevated from the center of the stage to off stage at 20 degrees. You will note the Loew's State horn installation, in the accompanying photograph, and the compactness of same. This horn box is powered by a counterweight and endless operated at a convenient location off stage by one man. (Note the space from the stage floor to the horn box when in use.)



Hydraulic film filter



Horn installation in a Loew theatre. The two center horns are for the purpose of directing the sound to 150 seats on each side which formerly were outside the sound area

Turntable Mechanical Filter

The Bell Laboratories after a long period of research and experimentation developed the mechanical filter system for the disc reproducing unit. It was designed for the purpose of eliminating fluctuations in the velocity of the turntable caused by mechanical vibrations and irregularities in the gears between the motor drive and the turntable. It was found impossible to manufacture gears perfect enough to eliminate these vibrations, making a mechanical filter necessary.

The filter system is introduced between the last gear and the turntable. This mechanical filter involves a flywheel and a flexible connector between the flywheel and the drive gears. The turntable disc acts as a wheel and the flexible connector consists of a series of six springs connecting the last gear to the turntable. By properly proportioning the moment of inertia of the flywheel and the flexibility of the springs, the "flutter" caused by the mechanical vibration of gears is smoothed out to a point where it is imperceptible.

Lens Errors

THE one great question, which is before the entire industry at the present time, is the standardizing of one aperture size to take care of Movietone and Vitaphone presentation. Two picture sizes are objectionable in any theatre. As you all realize, it is necessary to mask the sound track at the aperture in the motion picture mechanism while projecting Movietone subjects. This leaves a space omitted on the left of the projection screen.

There are two methods used at the present time to correct this condition. We are using the Movietone Flipper in many theatres. This is a masking piece, installed and mounted on a "slote" and operated by an "endless" at the side of the screen.

Many theatres manipulate the Movietone Flipper by hand and others have installed a perfected motor control, remote controlled from the projection room. However, this is one way of taking care of the situation. It still leaves the picture out of proportion with the Vitaphone and silent picture.

The Lens Method

The other and most popular method, called the lens method, is used by many prominent theatres to restore the Movietone picture to normal size. However, the lens method requires great skill.

When the lens method is used to restore the Movietone picture to normal size, it is necessary to use an undersize aperture, and one-half inch equivalent focus shorter focal length lens.

Besides, the Movietone picture must be centered on the screen, which makes it necessary to move the projector base sideways or else provide an adjustable lens mount, to accommodate centering the Movietone picture, as the height of the picture aperture is reduced proportionally to the width of the sound track masking and with a shorter focal length lens, the picture is restored to normal size.

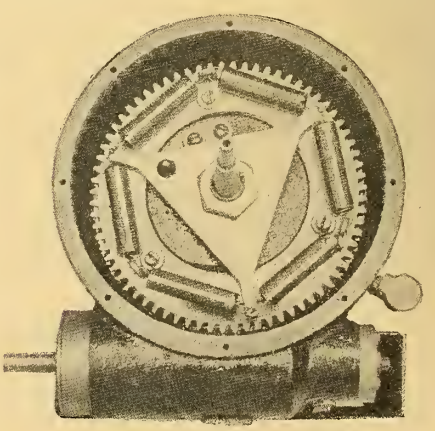
It is quite evident that motion picture projector manufacturers, and also sound equipment companies, have not taken any interest toward correcting the condition of restoring the Movietone picture to normal size, with the exception of supplying adjustable apertures with side masking to mask the sound track.

It has been left to each circuit of theatres, or individual theatre, to correct this condition to their own satisfaction. Otherwise, while presenting Movietone subjects, the presentation would be spoiled by the picture not being properly masked.

Noisy Valves

When tubes are repeatedly short-lived in a particular apparatus, all voltages should be checked by an expert, and an efficient voltage installed, if necessary. When noisy valves are encountered, they should be removed from their sockets and the prongs cleaned with a nail file. It is, of course, imperative that all valves be placed in their proper sockets.

Valves should never be removed while the apparatus is turned on.



Mechanical disc filter

Equipment

Motiograph Anniversary

THE first anniversary of the offering to the trade of the new Model H Motiograph projector has now been reached. When this new idea in projectors was introduced a year ago, much interest was displayed in it because of its radical departure from the conventional in the matter of the shutter mechanism which had been in use for many years, and which many thought could not be improved.

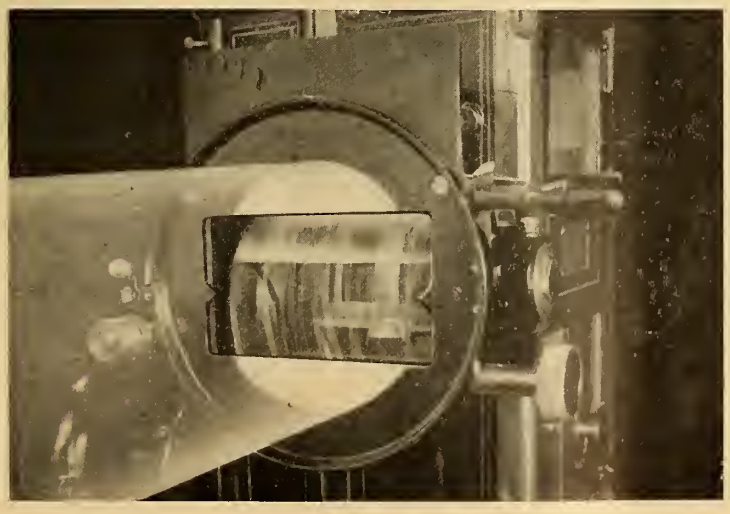
Most all projectionists remember that in the course of their training they individually felt that the shutter could be improved upon, and there are few who have not at some time or other tried out some particular pet theory of their own with an eye to increasing the efficiency of the projector. Most of these ideas never worked any better than did the original projector shutter supplied by the manufacturer.

Upon the introduction of the new Model H Motiograph, which featured a new type horizontal cylindrical shutter, there were many who were skeptical as to how it would perform. This new Motiograph cylindrical shutter is not only of a design different from the familiar rotating disc type of shutter, but is positioned differently in that it is located at the rear of the aperture between the light and the film, as shown in the accompanying illustration.

Enterprise Optical Mfg. Co., manufacturers of the Motiograph projector, have long been in the front rank of those who advocate closer contact between the maker of equipment and the projectionist who must use the equipment daily. The projectionist being daily employed has the better opportunity of realizing first what improvements and possible changes are necessary for the betterment of projection, but rarely is he in a position to work out such ideas practically. On the other hand, the manufacturer, while having the engineering, research and factory facilities, does not come in as close touch with projection needs as does the projectionist. Closer contact between projectionist and manufacturer is the aim of the Enterprise Mfg. Co.

The pronounced success of the new Model H Motiograph would seem to indicate that the aforementioned difficulty has been overcome in some degree, for the improvements contained in this new projector were made only after an exhaustive survey among projectionists brought forth many ideas for improvement in design and construction. The manufacturer's claims of better projection, elimination of heat on the film, sharper focus and increased efficiency of light transmission, together with the overcoming of warping and buckling, would seem to have been substantiated by reports from projectionists everywhere on the efficiency of this projector.

The Model H is particularly adaptable for use in sound picture work, inasmuch as the new shutter not only serves to better screen projection but, due to its elimination of heat from the film and the prevention of warping and buckling, also delivers better screen and sound results.



Showing the Model H Motiograph shutter which is positioned at the rear of the aperture between the light and the film

National Record Cabinet

The National Theatre Supply Co. is now offering in all its branch offices a 20-shelf, steel constructed record cabinet. The shelves are covered with green felt to protect the records. The cabinet contains, in addition to the shelves, one drawer equipped with two needle cups and ample space for all necessary projection room tools. The cabinet is very sturdy and compact and is finished in olive green. Price complete $65.00.

Synchrodisc Sales Mount

Synchrodisc, a product of the Weber Machine Co., 59 Rutter St., Rochester, N. Y., is now installed in more than 300 theatres throughout the United States and Canada. One of the features of Synchrodisc is the spring suspension drive which, with a heavy record plate, eliminates all uneven motion and is warranted by Weber to be far superior to a direct gear drive. Other features are a fly wheel on the drive shaft, insuring a positive yet flexible drive;



Weber synchrodisc

a guard that has two pockets for needles; and a tone arm which has been checked for perfect reproduction.

The new Synchrodisc drive is a flexible coupling that gives a positive drive and yet is flexible enough to take up any misalignment in setting up, and which is so constructed that there is no metallic contact between projector and turntable. All bearings on the machine are of the highest grade, and all working parts are submerged in oil. The Synchrodisc is leveled up and bolted to the floor.

Miles Speaker Units

A new line of speaker units for sound reproduction has been announced by the Miles Manufacturing Co. of New York City, pioneers in speaker unit manufacture. The new Miles M 10 exponential air column speaker has been designed especially for theatre use, and preliminary tests have shown the horn to give perfect reproduction over a wide frequency range.

All Miles horns are water-, weather-, and moisture-proof, and are sold on a basis of delivering complete satisfaction. Miles engineers are available for advice on any and all speaker problems, without any obligation on the part of the inquirer to buy. The Miles line of speakers is unusually complete, thus insuring a wide choice of speakers to meet the demands of the individual theatre. A booklet describing the Miles line may be had by addressing the Miles Manufacturing Co., 31 West 21st St., N. Y. City.

Room Ventilation

Projection room ventilation has two separate and distinct functions. First, it must exhaust all of the hot gases from the arcs, remove foul air from the room, and maintain comfortable temperature at all seasons of the year. Second, it must be capable of exhausting all fumes from burning film, in the event of a film fire, as fast as they are formed.

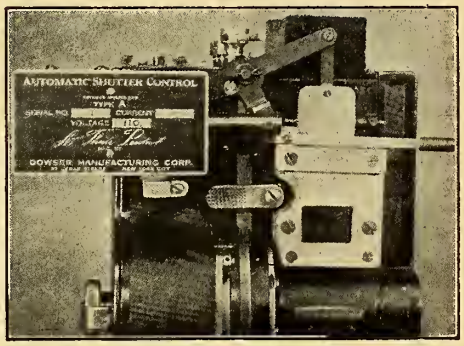
The Invisible, Noiseless Changeover for SIMPLEX—MOTIOGRAPH F.—SURE FIT HOLMES—SUPERIOR Projectors

AUTOMATIC SHUTTER CONTROL

and

3-WIRE CIRCUIT FOOT SWITCH

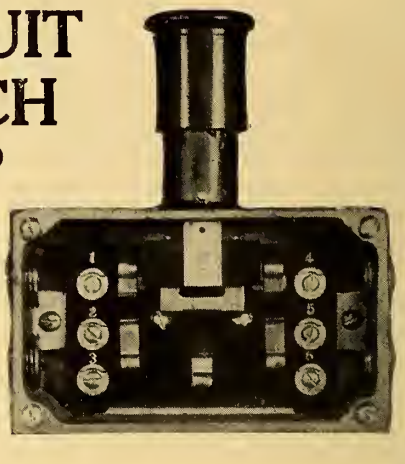
(Miniature power house)



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The Theatre Joins Radio*

By WILLIAM S. PALEY

President, Columbia Broadcasting System, Inc.

RADIO and the theatre, once considered potential rivals, have become allies. Scientific progress has served to introduce sound into motion pictures and has brought about a reasonable prospect for vision in radio broadcasting. This advent of an element into each field that was formerly peculiar to the other has resulted in a mutuality of interests of such far-reaching significance that unlimited new possibilities are dawning in the entertainment world. Talking motion pictures are an accomplisheed fact. Television is just around the corner.

Effect of Merging Interests

Just as the films utilized the resources of radio science to give the screen a voice, so is it reasonable to assume that radio broadcasting will eventually borrow from the master minds and facilities of motion-picture studios and the legitimate theatre in the presentation of visual radio entertainment. What will be the effect of this merging of interests on the economic structure of the entertainment business? Does the prospect of television carry a threat against the thousands of theatres throughout the world?

Maintaining a Balance

Questions such as these quite naturally arise when we are faced with the prospect of new and revolutionary changes in any line of endeavor. Yet, when one pauses to consider the subject * * * science, like nature, always strikes a balance. Scientific advancement, sudden as it sometimes is, seldom destroys those things it presumably replaces. In most instances, quite the reverse is true. New inventions make older ones more useful.

In many quarters it was felt that radio broadcasting would spell doom to phonographs. Instead, radio provided the phonograph industry with electrical recording and reproduction and a new conception of tone qualities and volume that opened up a vast new market. Instead of driving out the phonograph, radio stimulated it into a new usefulness.

The Fallacy of Fears

The coming of radio broadcasting also brought fears to the minds of some that motion pictures would suffer by reason of the fact that the public would remain at home. The fallacy of these fears is proved by the fact that attendance at film houses has increased consistently year by year and that new and larger theatres are constantly under construction. Added to this is the fact that radio engineering gave the screen voice, music and the multitudinous sounds of human and natural activity, thereby bringing theatre attendance to new heights.

It will thus be seen that the progress of science is not destructive. The public of today assimilates every new product of scientific genius. The public demands more than it ever did before.

The importance of entertainment cannot be overestimated. It is more than an axiom that the public has to be amused and entertained. It is an economic necessity. What the motion picture and the legitimate stage have done for the worker wearied by a day of toil has been dealt with in pulpit and press and debated for years by statesmen and educators.

People have assembled to be entertained and instructed for thousands of years. They will continue to assemble for these purposes for years to come, I believe. The theatre is a natural institution. It is the expression of group psychology. Man is a social creature; he likes to rub shoulders with his fellows. Emotional response in an audience is infectious. Laughs engender laughs, thrills sweep like an electric current through the multitude, and scenes of dramatic poignancy affect a group mind that exists for the moment as one, despite the fact that it is composed of thousands of units.

The Theatre Will Thrive

Even when television is perfected on a commercial scale and broadcast directly into the homes of millions, the theatre will continue to thrive and advance as the meeting place of entertainment-seeking multitudes. And when this day of successful television comes, whether it be in five or a score of years, it will play a large part in the operation of the very theatres that some skeptics now feel it threatens.

Our imaginations can run riot when we speculate upon the illimitable possibilities of television in relation to motion-picture theatres. Consider the field of the newsreel alone. Imagine flashing on the screen instantaneously in sight and sound a news event of major importance as it is taking place! Visualize the possibilities of great events in the world of sports being broadcast visually and orally from a centralized control for the millions of fans assembled in theatres throughout the civilized world! World series baseball games, major football events, automobile and horse races, transpiring the instant they occur on super-sized, natural-color, stereoscopic screens!

Perfections in the projection of motion pitures will play a large part in making television applicable to theatre, rather than home, presentation. An increasing use of color is being made in current film productions, and already considerable progress is reported from the laboratories where television images have been broadcast in color. Experiments for stereoscopic motion pictures, i. e., those having a third,

(*Continued on next page*)

*Courtesy *The New York Times.*

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THE SHOW MUST GO ON!

There must be no interruption in the Performance.

It's the first law of the stage and applies from the Manager down to the mechanics of operation, alike.

Are you safeguarded against a "Dark House"?

Have you a "reserve guard" against possible current interruption?

Can you throw in another switch and instantly shunt around the trouble?

A reserve Transverter means sure protection.

Permanently valuable—ever ready for the crisis.

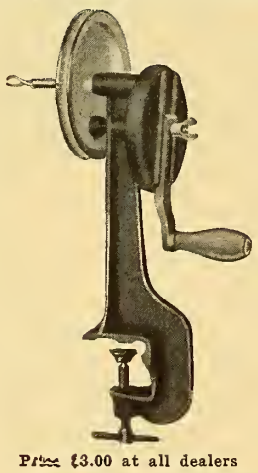
One "Dark Night" will cost you in prestige and seat sales many times that extra Transverter.

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Perkins Electric, Ltd.

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Exclusive Manufacturers of the Transverter.



Complete your sound equipment with a

"BEST"

Rewind Pulley

Takes the place of space collar on Reel shaft—Crank is not Removed

Manufactured by

BEST DEVICES CO.

2108 PAYNE AVE. CLEVELAND, O.

Price $3.00 at all dealers

Sound Film Radio Program Cuts Wire Costs

A SOUND-FILM radio program producing and distributing system has been formed by the Radio Cinema Vision Corporation, a newly organized concern. The plan is to make films recording sound only, to be broadcast in English and foreign languages and shipped to broadcasting stations throughout the world for use instead of living entertainers.

Under the plan a new type of entertainment will be broadcast, including noted radio stars, well-known plays, musical comedies, entertainers and orchestras who will give their renditions in the studios before the microphones linked with a recording device which contains unexposed films like motion-picture films, but of only sufficient width to accommodate the "picture of the sound vibrations."

Eliminates Wire Costs

"The films will be sent to the affiliated radio stations for simultaneous broadcast," said Mr. Strauss, president of the new company. "The use of the films will eliminate the necessity of linking stations by land wires."

"We have founded this organization and perfected this system," said Mr. Strauss, "for the purpose of broadcasting radio programs by special device, using films, over an international network of stations. Our device makes recordings of programs perfect in tone and quality, eliminating blasts and imperfections which often occur when the natural voice is used through a microphone. The reproducer can be plugged into the station's control amplifier. When the film is started the program will go out on the air. No wires are used in this network. Each film will be released to the broadcasters on certain dates."

The Theatre Joins Radio

(*Continued from preceding page*)

or "depth," dimension, are being conducted simultaneously with similar experiments in television.

The combination of these three elements, together with spoken dialogue, music and natural sounds, will set a standard for screen entertainment that audiences naturally will expect and demand when television entertainment becomes a commercial practicability.

Legitimate Stage to Survive

The question is raised, "Very well for motion-picture theatres; but what of the legitimate stage?" Nothing—no new development that may ever arise, I believe, will kill the legitimate stage. If such were the case, it would have fallen before now—it would have succumbed to the force of motion pictures. True, this phase of the entertainment field is less indispensable now than it was when there was no other way of reaching the great mass of people with some other form of drama, music or comedy.

But so long as human nature prevails, people will continue to desire to see actors in the flesh, no matter how superb any form of reproduction of their images may be, regardless of the discrepancy in convenience and expense.

As an Engineer Views Sound Pictures

By E. H. Hansen

Chief Sound Engineer, Fox Film Studios

PROJECTION, and in using that term it is implied to contain sound reproduction, is in the final analysis the determining factor of present-day motion picture production. The projectionist is not only capable of producing sound and picture to a perfection originally intended, but has it within his power to enhance and add to that original quality.

There are three important factors affecting reproduction, namely, level or volume, quality or frequency characteristic, and ground noise.

Loss of Illusion

Level is a most important item and determines illusion and reality. The effect of a diminutive star shouting an intimate line with the volume of a fog horn dispels all favorable audience reaction. Another loss of illusion comes during a period of what is known as shock noises, i.e., discharge of firearms, collision, etc., when the volume of sound is insufficient.

In recording, the Fox Movietone system has a usable range of from minus fifteen DB, the average grain and ground noise level of average print, to a plus fourteen DB or the overload point of the recording Aeolight.

It will be seen that there is available a range of some twenty-nine DB to cover the enormous variation from a whisper to the discharge of a sixteen-inch coast defense gun. However, it is not desirable to actually reproduce to its original intensity all sounds, but merely create an illusion by a material difference.

Responsibility of Projectionist

For average theatres a variation of thirty-five DB in transmission of light through a print will sufficiently cover the usual sounds encountered in recording. There is, however, a difference of some six DB or three steps on the reproducing fader between the amount permissible on the film and that required.

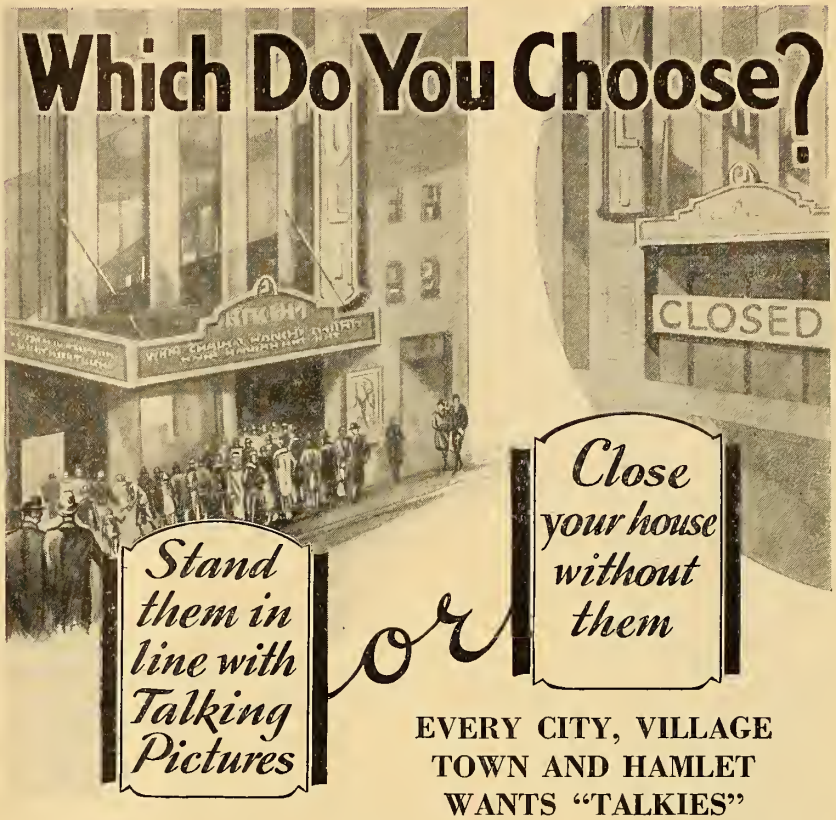
This, until such a time as we have automatic volume controls, must be supplied by the projectionist, and is usually the difference between mediocre reproduction and perfect performance.

Recording Faults

The recording engineer is not always guiltless in the matter of supplying negatives whose scenes match preceding scenes and whose shadings of voices are perfect. Another variation and probably the most constant offender is the variation in print due to laboratory work. With the installation of machine developers this situation is being improved.

A quality comparable to that originally recorded by the sound engineer is attained only by a reproducing system in perfect adjustment. The optical slit system and exciting lamp are usually the worst offenders and the hardest to locate.

Strict adherence to the cue sheet will keep Mr. and Mrs. Audience ignorant of our present shortcomings.

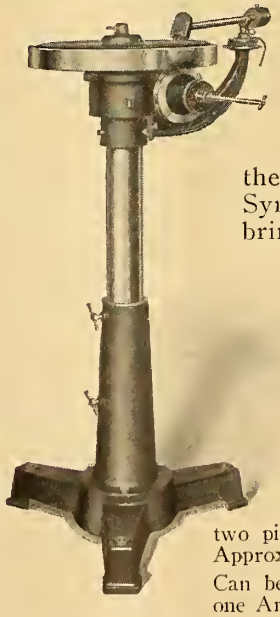


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You need not spend a large sum of money in order to give your patrons the best in sound pictures today. The Syncrodisk will delight your audiences and bring you return business.

DETAILS

Syncrodisk is the machine that is perfection in the smooth even motion that eliminates the wowing on sustained musical notes. All gears are submerged in oil. It is guaranteed to give absolute synchronization, quiet vibrationless operation and long life.

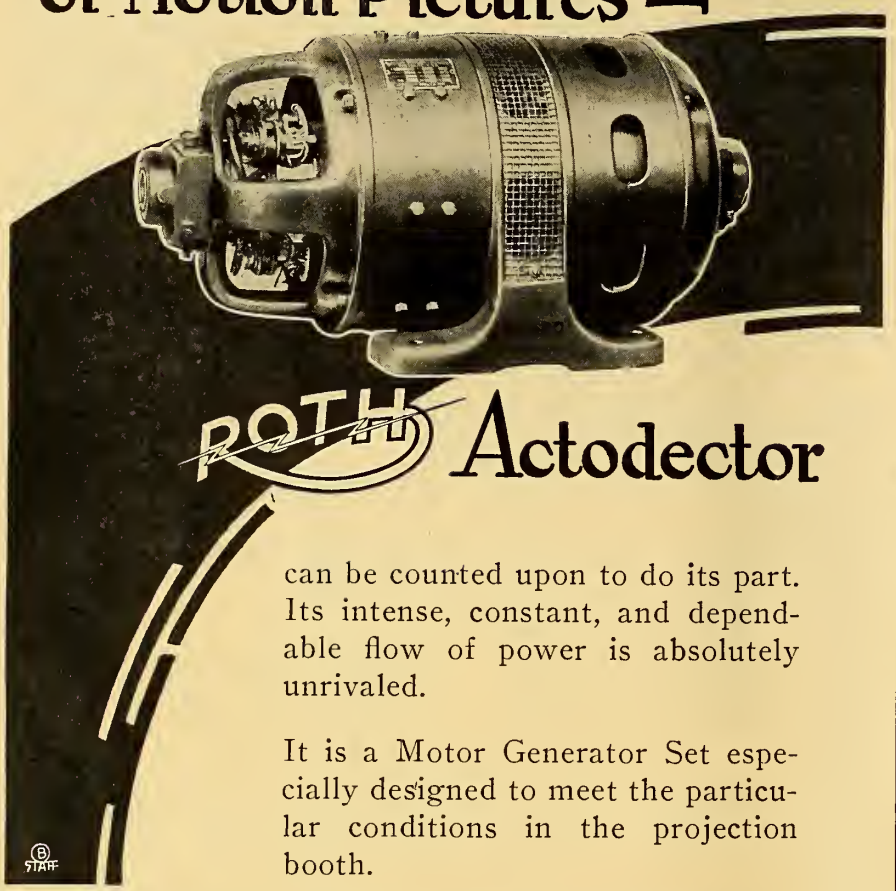
The method of connection with any Projector is simple in the extreme and in an hour you are ready to run the standard 16" Synchronized Disks. Comes complete with two pick-ups and fader. Each unit weighs about 150 lbs. Approximately 300 in successful operation today.

Can be supplied with two Wright-DeCoster Speakers and one Amplifier for $750.00.

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ROTH Actodector

can be counted upon to do its part. Its intense, constant, and dependable flow of power is absolutely unrivaled.

It is a Motor Generator Set especially designed to meet the particular conditions in the projection booth.

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Complete Sound Picture Service!

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Color Catalysis Achieved by G. E. Engineer

BLUE shadows were created out of the refraction of red and white lights on a curved white surface recently as F. J. Cadenas, illuminating engineer of the General Electric Company, gave the first public demonstration of third dimension on color in lighting.

Yellow Gothic arches were created by the mingling of blue and white lights, and various different colors were repeatedly produced as single primary colors were mixed with white. A gray light shadow was materialized by Mr. Cadenas as he progressed with his demonstration of what may be done in the way of lighting by the process of "color cracking," as visitors termed his method.

The Equipment Used

The source of the light used in the demonstration was two triangular fields of red, blue, green and white lamps set in the 90-degree angles of a fluted board. The light produced by the lamps in these nooks was reflected on a concave surface coated with flat white paint. This concave board was back and above the fluted board and the light arches in the demonstration set centered on it at a point about three and one-half feet from the triangular groups of lamps.

With this concave surface as a canvas and a battery of electrical controls and resistance dimmers as his pallette, Mr. Cadenas produced his colors.

First he made a red-brown light cone on the wall by turning on only the green lights in the angle in the front of the fluted board and the white lights in the angle to its rear. Then, using only the blue front lights and the white lights back on the board, the cone of light reflected on the concave surface above became yellow.

Nine Months of Experiment

The phenomenon is the result of nine months of laboratory work, Mr. Cadenas says, and admits that thus far neither he nor anyone else has explained it.

"The process appears to be something like that of catalysis in chemistry," Mr. Cadenas said. "It is known that manganese dioxide will cause potassium chlorate to decompose. In some manner, apparently somewhat similar, the reflected lights in coming together on the concave surface appear to disintegrate the color and make the reflection appear as an entirely different color."

He added that tests with a spectroscope have proved that the new color shadows are not optical illusion, although shadings are somewhat sharper when viewed with the naked eye.

He said that an artist who witnessed the demonstration offered as a possible explanation the theory that if one irritates the eye with an abundance of a certain color, to relieve itself of the resultant irritation the organ of sight will look away and the vision will produce the complementary color.

Eye Tests for Illusions

As an indication that the demonstration cannot be explained as an optical illusion, it was pointed out that the shades pro-

Television Soon, Says Theatre Chain Head

HAROLD B. FRANKLIN, President of Fox West Coast Theatres, writing in that company's house organ *Now*, has the following to say anent the development of telcvision, its application to the amusement field, and the place of the projectionist in the general scheme of things when commercial television becomes commercially practicable:

. . . We are all speeding the search for the solution to saner sound—and pave the way for what surely must be at the other end of this new movie avenue—practical television! It matters little whether television is supposedly three, five, or ten years away; we must move on the theory that it is just around the corner—six months hence.

We have learned a great lesson from sound—a lesson in preparedness. Let's be honest with ourselves by admitting that there was little occasion for our not foreseeing many of the pitfalls of the carly stages, into which we were plunged headlong by sound's unexpected popularity. And, when there was little excuse then, there is *no* excuse now. Sound presentation must be as nearly perfected as is possible—as quickly as possible—by the individuals governing it. This means all of us; but, more than anyone else, managers and projectionists.

Only when sound is flawless in the exhibition end of the industry can the progress of the producer be unhampered in new fields. Only when our patrons' ears enjoy perfect sound entertainment emanating from the theatre projection room, do we dare plan television. . .

Today's projectionists will be tomorrow's television engineers at the theatres. How far away that tomorrow is depends a great deal upon you.

Two New Improvements for the booth

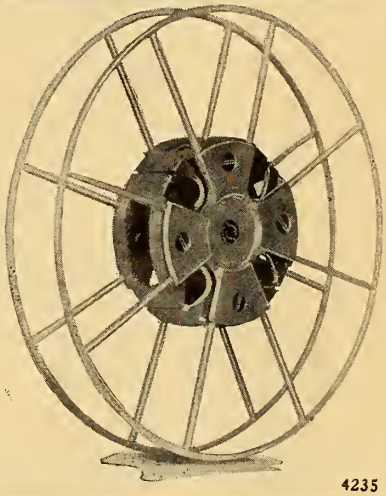
AS in other important phases of theatre equipment, improvements that mark the general advance in projection efficiency are, in most instances, offered *first* through National Service. . . . No where else can the projectionist find the complete line of modern booth equipment that National offers for his selection.

National Theatre Supply Company

Branches in All Principal Cities

THIS new sound film reel is rapidly being adopted by projectionists who are desirous of obtaining best results from sound pictures. The 5" hub—an exclusive feature—gives much better balance than is possible with the average reel. It is so smooth in operation that the danger of damaging the sound strip on the film is eliminated. Constructed of the finest grade welded steel wire sides with a sturdy aluminum hub.

Three sizes. Eleven inch, $4.75 *F. O. B. Factory.*



4235

"American Beauty" electric soldering irons and "American Beauty" electric melting cups (or ladles)



THERE are a hundred uses for this soldering iron in a projection room. This new electric iron eliminates the serious fire hazard and saves the time and trouble involved in the use of old style flame-heated irons. It may be used interchangeably with a melting cup or soldering tip, as illustrated. Convenient, reliable and economical.

Prices on request

duced by mingling of white and single primary colors appeared to be permanent and in no sense a shifting vista such as might be produced by scrambling of colors.

While the scientific explanation of his method is still a mystery to everyone, including himself, Mr. Cadenas said that officials of the National Lamp work division of the General Electric Company have tested it and found its results exact enough to plan commercial development. Interiors of theaters and ballrooms could be "painted" with Gothic arches of myriad lights and constantly changing borders of pastel shades. Such installations, he said, would be made to execute their repertoire of color by means of motor driven machinery operated by remote control.

"I am ready to defend the fact of my color production method against all assaults, but I admit I cannot now gauge what mood and emotional effects it will have on people," Mr. Cadenas said. "It may be that in sweltering days, the projection of cold blue light designs might be used in creating an impression of coolness."

Lighting "Rio Rita"

IMAGINE some 19,500,000 lighted candles spaced one foot apart! In a straight line, they would reach from Los Angeles to New York and double back to Chicago. Reduced to a common denominator, that is the electrical energy used in making the Technicolor sequences of Radio Pictures' all-talking, all-musical extravaganza, "Rio Rita."

Photographing in Technicolor demands just double the light necessary for making scenes in black and white. This is because the color screens used in front of the lenses have the same effect as putting dark glasses on the eyes.

On small sets doubling the amount of light does not mean so much, but since "Rio Rita" was made on a gigantic scale, the sets were spacious and to achieve the finest effects lights were used with amazing prodigality.

The smallest of these consumed 1,000 watts, the largest 10,000 watts. With their mirror reflectors their brilliance was multiplied many times. Getting down to basic figures, here is the list of incandescent bulbs used, the size and aggregate wattage:

Number	Wattage	Total
97	1,000	97,000
192	2,000	384,000
95	5,000	475,000
2	10,000	20,000
386	18,000	976,000

Multiplying this total wattage by eight, the number of days the company worked on the color sequences, brings the aggregate wattage to 7,808,000. Electrical engineers declare a 40-watt bulb gives approximately 100 candlepower, or 2½ candlcpower per watt. Thus, 7,808,000 watts means 19,520,000 candlepower.

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SOUND

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COLOR

at

Low Cost

EASTMAN *Sonochrome Tinted Positive Films* **translate every mood of the screen into color. Their sixteen delicate tints lend subtle atmosphere to every scene....Better still, they are so adjusted that they give pleasing, faithful, sound reproduction....Best of all, they are available at a cost no higher than that of black-and-white.**

Versatile, effective, inexpensive, Eastman Sonochrome is the answer to many a sound-and-color question.

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Give This to Your Friend — Have Him Fill It in and Mail to us at Once

The Motion Picture Projectionist
45 West 45th Street, New York City
Gentlemen:

Enclosed please find $2.00 for which enter my subscription for one year (12 issues) starting with ..... issue. (Two years, $3.00.)

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English Plan to "Censor" Sound Equipment

(From The Bioscope)

THERE has been a great deal of speculation as to the way in which the Inspection Committee, set up by the renters to censor installations of talking equipment, will work. The details now available show that there has been evolved a system which is so fair in its operation and so comprehensive in its scope that it will certainly obtain the support of exhibitors and makers of equipment alike.

The head of the organization will be Major Bell, whose technical qualifications need no emphasis to the trade. The whole country will be divided into three areas. There will be three Supervising Engineers and six District Engineers, each area, of course, having one Supervising Engineer and two District Engineers.

Supervision Necessary

It is not the aim of the committee merely to pass a particular installation and then leave it to the mercies of the exhibitor or his projectionist. The most perfect system, if inadequately supervised, can quickly degenerate so that the final results are extremely poor. Those who have travelled from installation to installation have frequently noticed that a cheap and really unsatisfactory set from a sound engineer's point of view can, in the hands of a highly competent and careful projectionist, be made to give surprisingly good results, particularly in the smaller type of hall. On the other hand, a good set, working rather above its proper capacity, can very quickly fall into a state likely to bring serious discredit on talking films in general.

Therefore, the principle has been adopted of having tri-monthly inspections. Every installation will be periodically inspected by a District Engineer, who will send in a report to his Supervisor and a duplicate copy to Major Bell. If the report is satisfactory, nothing more will happen. If the report is bad, then the Supervising Engineer will visit the hall himself and report, in his turn, as to the performance he has attended. If he agrees that conditions are bad a third visit will be made, this time in company with the Supervising Engineer. A letter will be forwarded to the exhibitor drawing his attention to the conditions complained of, and a copy of this letter will, at the same time, be sent to the company which originally supplied the particular equipment.

In a vast majority of cases, no doubt, the exhibitor will promptly put his installation in order; but if he still neglects to do so, then the various renters will be notified that his installation cannot do justice to the films he projects. There will be no interference with the programme actually being run, but all future contracts will automatically be suspended and the exhibitor will accordingly find himself minus talking films for his house. If he desires to exhibit talking films thereafter, it will be open to him to notify the committee that his apparatus has been put into satisfactory working order.

Theatre Acoustics

By Samuel Bagno

SOUND is similar to light in a great many respects. Essentially they are both forms of vibratory motion. Both can be reflected, refracted (bent out of their path by a denser medium), and conducted. The wave length of sound is about 100,000,000 times that of light and, therefore, a medium that may appear to be exceedingly rough to us may be the smoothest reflector for sound vibrations. A brick wall will reflect about 99 per cent. of the sound striking it. The smoothest mirror we have will reflect only about 80 per cent of the incident light.

Unlike light which travels at 186,000 miles per second, sound is propagated at the comparatively slow rate of 1,080 feet per second. A sharp sound such as an explosion can be reflected, and re-reflected many times in a large room, and the time for the sound to die down completely may often be as much as 10 seconds.

The response of our senses to light and sound also differ greatly in the way the sensation is brought to the brain. The eye does not respond to each individual vibration of the light that it sees. We get a general and lasting sensation when we see a bright object. The vision even tends to persist after the light has been removed. It is due to the so-called "persistence of vision" that we get sensations of moving pictures. The ear, however, can distinguish the resultant change the instant the sound dies down. Each vibration of sound affects the ear separately. In our everyday speech we use different sounds at such a rapid rate that the sensation to the eye, if so many different lights were sent from the same source, would be a continuous blur. In a closed room the diminution of each separate sound of the voice may be of such a duration as to cause the separate tones to overlap and become indistinguishable. This property of a closed room is called *reverberation,* or continuous echo.

Reverberation

Reverberation is the most pronounced acoustical defect and becomes greater with the size of the enclosure. This is due to the fact that some of the sound is absorbed by the walls during each reflection. The farther apart the walls, the fewer the reflections per second, and, consequently, the less the sound absorbed in that instant of time. Once sound is generated it keeps traveling until it is completely absorbed. From this it follows that the larger the auditorium the longer the sounds will persist. These theoretical considerations have been completely verified by experimental evidence.

The results of some investigations carried on by Knudsen are given in the following tables. These results were secured in auditoriums of various sizes which, of course, had different periods of reverberation. However, due to the different types of reflecting walls and ceilings, the relation of the distance between walls and reverberation is not constant.

BRIGHTER, SHARPER PROJECTION ON

WALKER SOUNDSCREEN
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IT Delivers

50% More Light

Sharper Definition

Perfect Sound

No Fadeaway

BRILLIANT PROJECTION WITH LOW INTENSITY

The choice of the greatest circuits and finest theatres is the logical screen for your theatre

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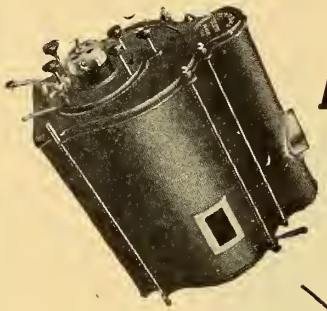
Volume (Cubic Feet)	Reverberation Period (Time for sound to diminish to .000001, its original value at 512 cycles)	% Words Understood by Audience	% Vowels Understood by Audience	% Consonants Understood by Audience
270,000	2.8 seconds	84.8	99.6	91.7
280,000	3.0 "	82.2	99.8	88.5
310,000	5.0 "	64.5	97.0	79.0
In two other halls where the walls absorbed much less sound the results were as follows:				
280,000	5.3 seconds	56.3	92.0	73.0
320,000	7.5 "	44.0	88.0	65.4

W. C. Sabine, who did most of the pioneering work in acoustics, defined the standard of reverberation as "the time it takes for sound to die down from the average sound intensity to the threshold of hearing at a frequency that is about one octave above middle C." This is a diminution in sound of one millionth its original value at 512 cycles per second.

Different materials absorb more or less of the sound incident on them, depending

(*Continued on page* 42)





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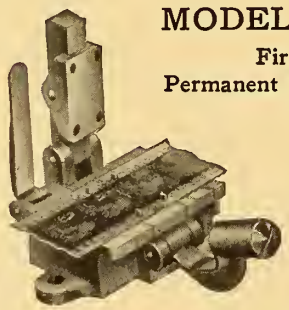
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Easton, Pa., Local Holds Annual Clambake

The following annoucement of the eleventh annual clambake of Easton, Pa., Local Union No. 203 is sufficiently explanatory of the affair to preclude the necessity for further comment:

Eleventh annual Deck Hands' Clambake, September 22, 1929, at "Nirvana," on Route 12 between South Bethlehem and Center Valley. Special attractions this year.

That human tank, Sir Jacob Henry Yock Miller, will positively be present and perform his spectacular dust-diving and quoit pitching act. Positively his last appearance in the United States. Also World's Championship Baseball between Well-Fed Projectionists, pennant winners of the Eatwell League, and Hungry Stage Hands, winners in the Lay-Off League. Played according to the Marquis of Queensbury rules with Indoor Baseballs. Manager Donald Whistle Bonstein notifies us that his coterie of stars will include "Ghost" Schmeider, Rocking Chair Lynn House-cleaning Phillips, Bad Prostate Bowers, Out-of-Focus Roberts, Henpecked Samhammer, Carbon Dust Frankenfield, Goat Rouser Charlie Seifert, Ground Hog Mack, What's Next Brey, Lawrence Krazy Katz, Beau Brummel Stamets, Alcoholic Wister, and his fleet outfielder, Crutch Bertz.

The Opposition

Manager E. Pussy Rudlin already claims victory for his Deck Hands, listing such well known luminaries as Underfed Dowling, Spare Ribs Miller, Fouled Traveler Fox, Laundry Slip Bowman, Jog Foot Wolfe, Hoof and Mouth Disease Fisher, Muff Barnes, Lanky Moritz, Eagle Eyed Monahan, Marks the Lawyer Schanahan, Lash Line Leiser, Abe Marcus Harrer.

Club Physician, Dr. I. P. P. P. P. P. Schwarz; Dental Surgeon, Molar Wrestler Sassaman; Water Boy Ingrown Heels House; Umpires, High Intensity Rizzo and Try and Get It Lang; Arbitration Board, Dick Green and Harry Dignam; Mortician, Charley Adams. Easton Headquarters, Saturday Night and Sunday Morning Lafayette Hotel.

Crux of Organization

IN the beginning, the primary problem of the union was organization. In the present, the primary problem of the union is maintaining organization. In the end, the primary problem of the union will be perpetuation of organization. All problems are resolved into organization problems. This is so because the union is working in the very unpredictable stuff called human nature. Human nature is a composite of blindness and foresight, stupidity and intelligence, of selfishness and enlightenment.

It is extremely difficult for a man to see that he can get more for himself by giving up certain privileges to the group, than he can by riding roughshod over the group. Usually he won't believe it. And sometimes, we are sorry to say, in the case of strong, ruthless individuals, the principle isn't true. The fellow can get more by exploiting the group, than by

Sound and Light Make Novel Roxy Effect

FOR the four weeks of the run of "The Cock Eyed World" at the Roxy Theatre in New York, the picture was surrounded by an effect which, although lasting only four minutes, represented one of the finest efforts of S. L. Rothafel ("Roxy") in effect lighting. The effect utilized the entire entertainment resources of the Roxy, including personnel and equipment, and the result obtained was the occasion for lavish praise of Roxy.

The stage proper was divided off in three levels, with each section presenting a different action. The presentation required twelve changes of curtains, including backdrops, scrims, tableau curtains and the regular motion picture screens. The projection equipment used for the effect included three projectors, rear projection apparatus, color wheels, spotlights and effect machines. While the projection room contributed its entire resources to the effect, the spot operators and stage electricians were busy, a crew of twenty-four electricians being employed in addition to the regular house personnel.

Combined Sound and Light

Eight spots from the dome of the theatre were used, in addition to fourteen lights from each side of the stage. Twenty-two stagehands operated sound machines which produced the sounds of bells, tom toms, thunder, guns and all sorts of whistles. Four lights, operating on split-second flashes, provided the lighting rythm.

On the top stage level there appeared a group of dancers, and on the level below another group in contrasting movement. On the stage level was a group of people of different classes and types representing many walks of life. The film used for the kaleidoscopic effect was gleaned from more than 45 newsreels and feature films and the whole clip offered a constant shifting of scene which fitted in perfectly with the lighting effects.

---

working within it. But it remains true for 99 out of every 100 persons; but because of the strong one, who rides roughshod, some of the 99 live in hope that they, too, may emulate the man on horseback. After all, this condition describes the true dilemma of organization. The appeal must be made to man's social nature, to triumph over his egoistic desires. It must be made to his civilized instincts in conflict with his cave-man appetites. The appeal is never sure-fire. Some men, by nature social, respond quickly. Many others ignore the invitation to rise to a level of human decency quite incompatible at times, with their natures.

We know that many honest but sentimental persons believe that getting men into an organization is simple. They take this child-like view because they have not met the foregoing paradox face to face in all its devasting diversity and tantalizing plausibility.—*Electrical Workers' Journal.*

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Vacuum Tubes Used in Sound Pictures

By R. H. McCullough
Supervisor of Projection, West Coast Theatres

AMPLIFIER tubes, while they give relatively little trouble, may eventually be the cause of poor sound reproduction or cause an interruption in the show which will reflect seriously on the individual theatre. It is the projectionist's responsibility to be able to recognize vacuum tube troubles, or symptoms of trouble, and thus be able to deal with them before the situation becomes acute. This responsibility is solely the projectionist's, and should trouble occur during the running of the show, there is no one to help him out of his difficulty. Therefore, a thorough understanding of the vacuum tube's construction, characteristics and function is necessary to intelligent sound projection work.

Life of Tubes

All Western Electric vacuum tubes are guaranteed for one hundred hours burning service. After receiving vacuum tubes, they should immediately be tested for defects, and if found defective, should be returned at once for replacement. The life of a vacuum tube will vary in direct proportion to the amount of abuse to which it is subjected. However, we have tubes which have given 3,000 hours of service and still are good. We have found that most of our poor sound reproduction was caused by poor vacuum tubes.

It is very important that the filament current be maintained at exactly the value indicated by the instruction book (E. R. P. I.). The filament of the amplifying tube is heated by the current from a storage battery of approximately twelve volts pressure. If the filament current is too high, it will materially shorten the life of the tube.

Do not allow amplifier tubes to operate with low filament current as the volume will be low and the quality will suffer; therefore, operate amplifier vacuum tubes at their indicated values as specified.

Rectifier Tubes

Essentially, all rectifier tubes must be in good condition. A portion of the amplifier power comes from rectified alternating current. Rectifier tubes require the same care and attention as amplifier tubes. It is extremely important that the indicated filament current values be maintained (as given by E. R. P. I.).

Pick-Up Noise

The pick-up amplifier, called the 49-A, located underneath the projector mechanism, is suspended in a spring cradle. This is for the purpose of absorbing the vibrations of the projector mechanism. If the P. E. C. amplifier touches any part of the projector, mechanical vibrations will be picked up and carried through the amplifier and will be heard in the horns.

It is very important to see that this cradle swings free of everything. Be sure that all tubes are inserted into their sockets properly—otherwise, you will en-

counter pick-up noise in the 49-A amplifier.

Filament in Series

The 49-A and the 41-A amplifiers operate with the filaments of two or more tubes in series. In such cases the failure of a filament in one of the 239-A tubes will extinguish all the tubes. It is necessary to inspect all the tubes to determine which one is at fault.

W. E. Reproducer

The present design of the Western Electric reproducer is somewhat different than other makes. The entire casing is filled with oil. This is a very good method for dampening or smoothing out any tendency of excessive vibration on part of the needle.

On the side of the case, opposite the magnetic poles, is a thin steel gold plated diaphragm to which the needle holder is attached. The flexibility of this diaphragm permits the needle sufficient freedom to follow the record groove undulations. It also acts as an armature.

Magnet Pole Pieces

One of the magnet pole pieces is in the form of a circle. It extends around the edge of the steel diaphragm. The other magnet pole piece is double and is located opposite the center of the diaphragm—its end a few thousandths of an inch removed from the diaphragm. It has a coil wound upon each of its prongs, which are both the same polarity.

The movement of the needle caused by the record groove undulations will be reproduced in the flexing or binding of the diaphragm—the greatest effect of which will be concentrated at its center. And since the center pole piece is placed at a certain fixed distance from the center of the diaphragm, when it is at rest, it follows that the needle movements will be precisely reproduced in alternations of distance between the diaphragm center and end of center pole.

Tube Failure Sign

When the amplifier tube is about to fail, it will be perceptible that the weakness usually shows at one spot on the filament. This spot will glow more brightly than the rest of the filament.

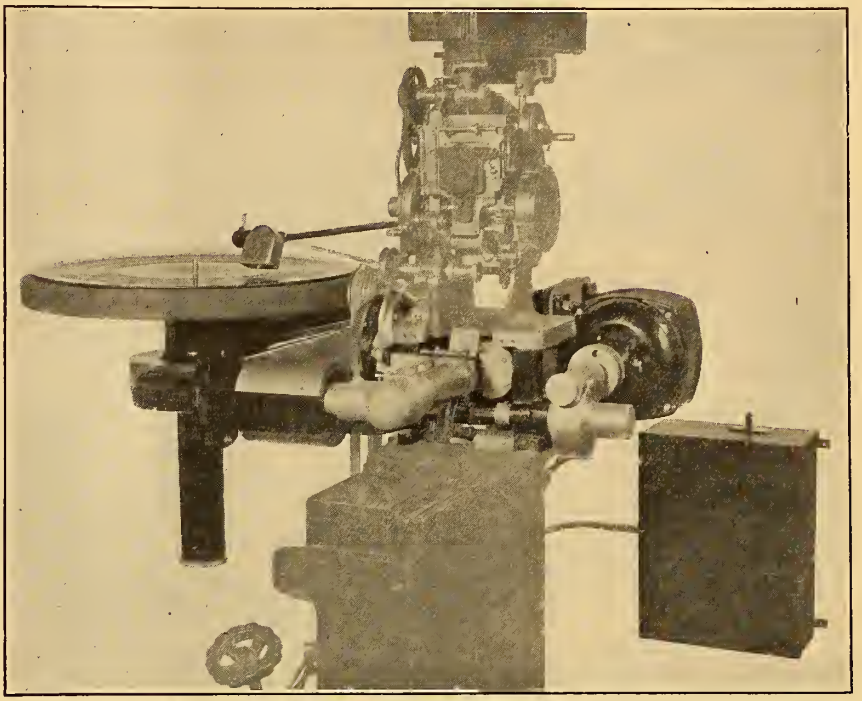
It is imperative to replace the tube with a new one immediately upon detecting the warning sign. Interruptions usually occur through negligence, and it is likely that the filament of a vacuum tube will fail in the middle of a sound reel, if you do not properly check the filament.

Noisy Tubes

Only occasionally will a noisy tube be found. Such tubes rarely give trouble except in the first stage of amplification. The frying and hissing noise is caused by the filament throwing off electrons at an irregular rate.

If you suspect a noisy tube, set the fader at zero. Then, if there is any noise, change the tube in the first stage, from the first amplifier, exchanging it for a tube from elsewhere, or insert a spare tube.

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Features

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The following general precautions are worth observing:

1. Rest the eyes when they hurt, and as far as possible do close work, such as writing, reading, sewing, wood carving, etc., by daylight.
2. Never read in a very bright or a very dim light.
3. If the light is near, have it shaded.
4. Do not rub the eyes with the fingers.
5. If eyes are weak, bathe them in lukewarm water in which a pinch of borax has been dissolved.

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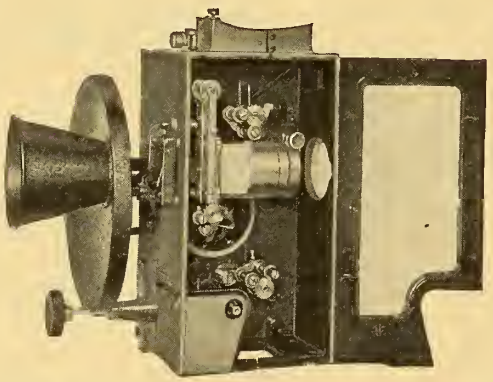
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Do It Now!

See and Hear Music by "Projection Osiso"

AN arrangement by which music can be seen as well as heard has been perfected recently. The device bears the name of "projection osiso."

Like the talking movie machine, the projection osiso gathers in sounds by way of a microphone, changes them into light waves and then deftly places them at a given point in their proper order. In the movie that point is on the side of a film; in the osiso it is on a grayish screen. When the attachment is resting, sixteen revolving mirrors make the light waves of silence appear as a straight line.

As soon as a musician touches a piano, however, the line begins to vibrate. Low, pure tones cause the line to ripple like a pond; medium tones shake it around more; complicated chords and noises produce patterns looking something like mountain peaks.

According to William B. White of the American Steel and Wire Company, who collaborated with the Westinghouse Electric and Manufacturing Company in developing the projection osiso and who demonstrated it recently in New York, the arrangement has two advantages.

"In the first place we are using it to study the construction of pianos and other musical instruments in order to improve them," he said. "You need only watch the waves formed on the screen to notice that when I strike successive keys on this piano, though I strike each with approximately the same force, some notes produce distinctly larger waves than the others. This means that those particular notes produce louder sounds than the rest, due to some peculiarity in the construction."

Mr. White said that sounding boards

Acoustics

(*Continued from page 37*)

entirely upon the porousness of the materials. The more porous the material the greater the percentage of sound absorbed. Raleigh pointed out that the sound absorbed by a reflector varied inversely as the radius of the pores multiplied by the square root of the frequency. At best the formula is only approximate because of the irregular slopes of the pores.

The remedy for reverberation seems obvious: to shield the walls with some absorbing material such as felt or cork so that more sound is absorbed during each reflection. Although this is the standard method used, it is far from perfect. Unless the material is comparatively thick (several inches), it will absorb only the higher frequencies. Since most speech is carried in these high frequencies—the harmonics—and since these higher frequencies enable us to differentiate between one musical instrument and another, it is possible, as J. J. Steward has shown, to decrease the reverberation period of a theatre and make the acoustics worse than they were before. The most efficient means of improving the reverberation is to strive for that happy medium at which the sound is most enjoyable to the audience.

reverberate better at some points in the scale than in others. It is hoped to investigate this characteristic.

The other use is in the training of musicians. Permanent records of musicians have been made by osiso, he said, and with these before him the student can try to reproduce them by way of the projection osiso.

The osiso in its older form, which is suitable for photographing waves and for scientific work, has been used in a number of electrical and acoustical investigations. It is the instrument used by Byrd's radio experts in the Antartic in their study of the behavior of radio waves.

Effects of Sunlight

Sunlight causes many strange, unexplained effects. If the two substances, chlorine and hydrogen, are mixed in a dark room, nothing remarkable occurs any more than though water and milk were mixed, but if a mixture of these substances is exposed to sunlight, a violent explosion occurs and an entirely new substance is formed, a compound entirely different in character from either of its components.

By some power not understood by man, the sun is able to form new substances. In the dark, chlorine and hydrogen are simply chlorine and hydrogen; in the sunlight they combine as if by magic into a totally different substance.

By the same unexplained power, the sun frequently does just the opposite work; instead of combining two substances to make one new product, the sun may separate or break down some particular substance into its various elements. For example, if the sun's rays fall upon silver chloride a chemical action immediately begins, and as a result we have two separate substances, chlorine and silver. The sunlight separates silver chlorine into its constituents, silver and chlorine.

Third-Dimension Process

A third-dimension process is now undergoing tests at the Brooklyn, N. Y., studios of the Vitaphone Co. which employs two projectors to project alternate images to both eyes. Considerable research work on this new process has been done in Dallas, Texas, with the inventors expecting to complete their experiments in the Vitaphone studio.

In describing the process, one of its sponsors, L. E. Randall, Dallas university professor, said:

2 Double-Lens Projectors

"The principle of the third-dimension movie is based upon optical illusion. Two projection machines will be used in such a manner that each alternate picture will be reflected in succession to the right eye, while each of the other alternate pictures will be reflected to the left eye. The machines will be equipped with double lenses, one projecting images with violet rays, the other projecting light which is deficient in actinic rays. These two images build on the crossed lines in the screen into images, giving the impression of depth to the audience."

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Credit the Cinematographer

PERHAPS no single individual contributes more to the artistry of a motion picture than does the cinematographer. The author may be famous, the scenarist the best in the industry, the director at the head of his profession, and the players all stars, but—what the audience sees on the screen is a picture, and if it is not photographed well the artistry of the above-named workers goes practically for naught.

It is a well-known fact that good photography can—and frequently does—save a mediocre picture. Without causing embarrassment by mentioning names, the writer recalls numerous pictures which have been successes solely because the photography was so wonderful that the audience forgot the poor story and poor acting and ordinary direction.

In other words, a cinematographer is the most important factor in the making of a picture. A director may have freak ideas, but it is the cameraman who puts them over because of his knowledge.

The Cinematographer's Place

However, the least publicized individual in the picture industry is the cinematographer. Even the prop boy and the wardrobe mistress come in for "breaks" in the papers, but the cameraman usually gets as his reward only the satisfaction of knowing he did a splendid job.

As a whole, this writer believes that the general public is interested in the cameraman—at least as much as in the minor studio officials who come in for much in the way of publicity blurbs. For years this writer has been finding a great deal that is truly of interest in these hard-working artists, and when magazines have printed his stories about the cameramen there has been no uprising against the publications by the public. And so, we wonder why the unusual and often adventurous exploits of these men are not publicized by those who write publicity for the studios.

Public Is Interested

Surely the public that has gasped over the marvelous effects of "Noah's Ark" would be interested in reading something about Fred Jackman, whose genius gave the picture the marvelous flood effects, and who can take a pail of water and a few twigs and create a forest wilderness with a lake in it. Surely the public would be interested in Hal Mohr, the chief cinematographer on that picture as well as the chief cinematographer on "Broadway," which is now being hailed as a photographic triumph by critics throughout the country. Most of the critics perhaps do not even know who photographed the picture.

Then, there was "Sunrise"—Charles Rosher and Karl Struss were awarded high honors by the Academy of Motion Picture Arts and Sciences. But how many people knew they photographed it! Surely, a word or two about the work of these men would not be amiss, and studio publicity writers would still be getting the name of their pictures in the press.—AMERICAN CINEMATOGRAPHER.

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Color Blindness

THE nerve fibers of the eye which carry the sensation of color to the brain are particularly sensitive to the primary colors—red, yellow, blue. Indeed, all color sensations are produced by the stimulation of three sets of nerves which are sensitive to the primary colors. If one sees purple, it is because the optic nerves sensitive to red and blue (purple equals red plus blue) have carried their separate messages to the brain, and the blending of the two distinct messages in the brain has given the sensation of purple. If a red rose is seen, it is because the optic nerves sensitive to red have been stimulated and have carried the message to the brain.

A snowy field stimulates equally all three sets of optic nerves—the red, the green, and the blue. Lavender, which is one part blue and three parts white, would stimulate all three sets of nerves, but with a minimum of stimulation for the blue. Equal stimulation of the three sets would give the impression of white.

Defective Nerve Fibers

A color-blind person has some defect in one or more of the three sets of nerves which carry the color message to the brain. Suppose the nerve fibers responsible for carrying the red are totally defective. If the person views a yellow flower, he will see it as a green flower.

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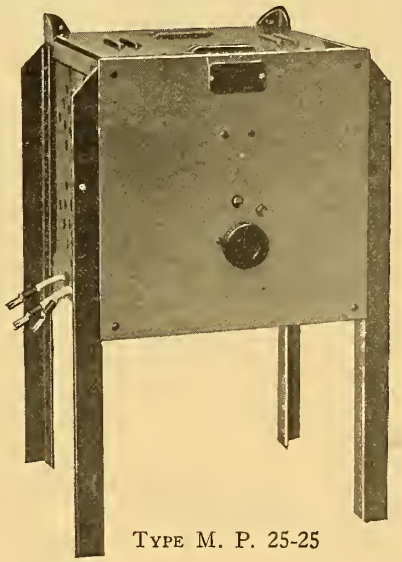
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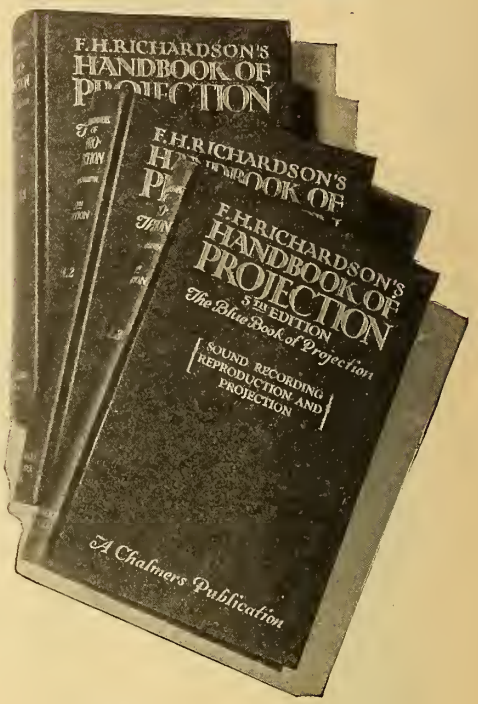
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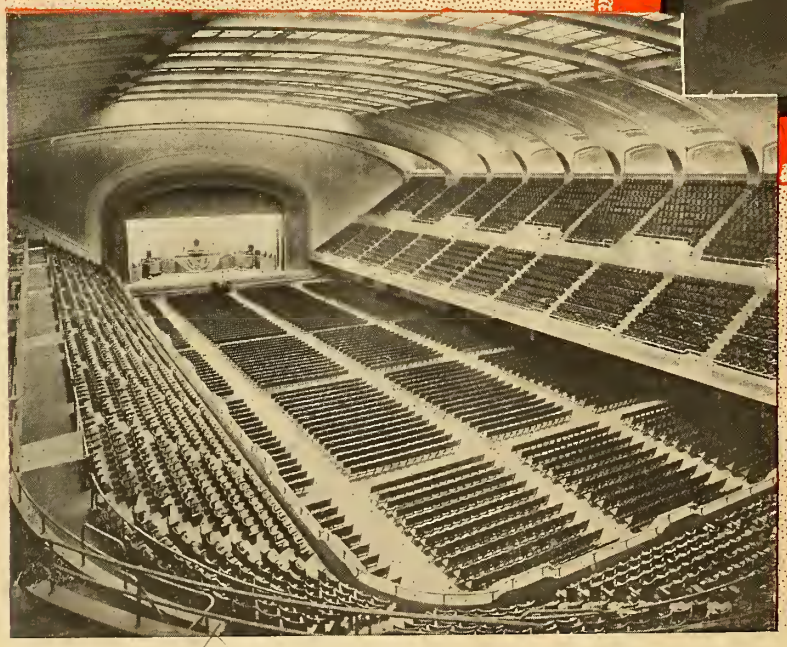
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LEFT — CLEVELAND PUBLIC AUDITORIUM

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